BIENNIAL REPORT

OF THE

STATE AGRICULTURAL COLLEGE,

MANHATTAN, KANSAS.

1877 ~~AND~~ — 18~~7~~88.

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STATE AGRICULTURAL COLLEGE.

REGENTS' REPORT.

To his Excellency George T. Anthony, *Governor of the State of Kansas:*

Dear Sir: The Regents of the Kansas State Agricultural College respectfully submit the following report and accompanying documents. The reports of the fiscal officers, and of the several departments of instruction, cover the period beginning December 1st, 1876, and ending June 30th, 1878. Those of the Regents and President are brought down to December 30th, 1878.

FACULTY.

During the collegiate years of 1876–77 and 1877–78, no changes occurred in the Faculty, as noticed in our last report. In the summer of 1878 the resignation of two professors made vacancies which have been filled, and the Faculty is as follows:

John A. Anderson, *President, and Professor of Political Economy.*
M. L. Ward, *Professor of Mathematics and English.*
George H. Failyer, *Professor of Chemistry and Physics.*
Edward M. Shelton, *Professor of Practical Agriculture, and Sup't of Farm.*
H. E. Van Deman, *Professor of Botany and Horticulture, and Sup't of Nursery.*
J. E. Platt, *Professor of Elementary English and Mathematics.*
John D. Walters, *Teacher of Industrial Drawing.*
Mrs. M. E. Cripps, *Teacher of Household Economy, and Sup't of Sewing Department.*
T. T. Hawkes, *Superintendent of Mechanical Department.*
A. A. Stewart, *Superintendent of Printing Department.*
W. C. Stewart, *Superintendent of Telegraph Department.*
S. A. Hayes, *Teacher of Blacksmithing.*
W. L. Hofer, *Teacher of Instrumental Music.*

NON-RESIDENT LECTURER.

Hon. D. J. Brewer, (of the Kansas Supreme Court,) *Lecturer on Practical Law.*

COURSE OF STUDY.

The course of study has been compressed into four years instead of six, as at our last report, and besides the saving of time and expense to the student, it has been made more practical and more directly adapted to the wants of the industrial classes of Kansas, for whose benefit the institution was endowed.

STUDENTS.

During the calendar year 1877, two hundred and twenty-eight (228) students, coming from forty-five (45) counties or States, were in attendance;

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and during the calendar year 1878, there were two hundred and thirty-eight (238) students, representing fifty-one (51) counties or States. Their progress has been highly satisfactory to us, and will prove most beneficial to them as future citizens of Kansas.

APPROPRIATIONS.

The last Legislature made the following appropriations, each of which has been duly expended for the specific purpose designated:

FOR FISCAL YEAR ENDING JUNE 30, 1878.

For the erection of a stone barn for farm department	$4,000 00
For finishing mechanical and College buildings	1,000 00
For sidewalks, stone	300 00
For the payment of the claim and interest thereon of W. H. Fletcher	1,974 46

FOR FISCAL YEAR ENDING JUNE 30, 1879.

For practical agricultural building	$12,500 00

Of the $7,774.46 given for the year 1878, but $5,800 were for improvements, the $1,974.46 being for the payment of an old claim contracted by a former administration and audited by the Legislature when making the appropriation. The action of the Board in the matter was simply clerical, in enabling Mr. Fletcher to draw the money. With the $4,000 given for a stone barn, a most serviceable and durable building has been erected.

In accordance with the statement made to the Ways and Means Committees of the last Legislature, the appropriation of $12,500 for an agricultural building has been expended in the erection of the north wing of the main College building. It is of stone, range work, raised pointing, two high stories and a cellar, and is 53 feet by 109 feet. The plans and specifications were prepared by Mr. E. T. Carr, architect, and the work has been executed under his direction. The present wing will be fully completed and furnished with the appropriation, and will be ready for use on the first of February, 1879. It has been planned for the recitations and cabinets of the Department of Practical Agriculture, but until the main building is erected will be in part used for other departments of instruction. It contains five large rooms for classes and museums, and four smaller rooms for offices. Taking into account the space and the character of material and workmanship, it is believed to be the cheapest building yet erected by the State.

The main building, for which there is an immediate and imperative need, will consist of a similar wing on the south, and of a central building, all being under one roof. The corridors will be 240 feet in length. The south wing is designed for the Literary and for the Woman's Departments, and the central building for an assembly room and offices. The architect is making a careful estimate of the exact cost; but, judging from our past experience, we anticipate that the whole building can be completed for $40,000; and when completed there need not for many years to come be any further call upon the State for the erection of buildings.

COLLEGE WARRANTS.

Under an act approved March 1, 1870, a former Board issued certain scrip, or "College warrants," in denominations of $100, amounting to $33,700, the last installment of which became due in 1877. An account of the liability can be found in the First Annual Report of the Board of Commissioners on Public Institutions, 1873. As these warrants have matured, previous Legislatures have made appropriations for their payment; and the joint Ways and Means Committee of the last Legislature recommended an appropriation of $11,000 for the final settlement of the indebtedness. The measure failed in the House; and in the last days of the session a bill was passed authorizing the Board to invest the endowment fund in bonds, with which to take up these warrants. As there was no other method of preventing suit and preserving credit, the Board accordingly issued the bonds and paid the warrants. A reference to the provisions of the Congressional act, which provides that the endowment shall remain forever undiminished, will satisfy any one that the use of that fund for the payment of these warrants is in violation of the law of Congress. Accordingly, we respectfully request that an appropriation be made for restoring this sum to the endowment fund.

The Congressional law further provides that the State shall be at the expense of the management of the lands and investment of the endowment. To prevent the sacrifice of property under the "tax decision" of the Supreme Court, we have, under an act authorizing us so to do, paid taxes and other expenses connected therewith from the funds of the College. We respectfully submit that, in accordance with its obligation as a trustee of the General Government, the State should reimburse the College for expenditures, which in honor and justice should have been paid by the State.

The accompanying reports furnish any additional information that may be desired. All of which is respectfully submitted.

STEPHEN M. WOOD, President,
W. L. CHALLISS, Vice-President,
JOHN A. ANDERSON, Secretary,
B. L. KINGSBURY,
J. R. HALLOWELL,
T. C. HENRY,
E. B. PURCELL,
Board of Regents.

MANHATTAN, KANSAS, Dec. 20, 1878.

EXECUTIVE DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen: During the calendar year 1877 there were two hundred and twenty-eight (228) students in attendance; of whom 150 were males and 78 were females; the average age being 18.12 years. Forty-five counties or States were represented, as follows:

Atchison	4
Brown	1
Butler	2
Chase	1
Cherokee	10
Clay	6
Cloud	1
Colorado	2
Cowley	1
Crawford	1
Davis	13
Dickinson	3
Ford	1
Franklin	2
Greenwood	3
Indiana	1
Jefferson	3
Jewell	2
Johnson	3
Labette	5
Leavenworth	3
Linn	1
Lyon	6
Marshall	3
McPherson	1
Missouri	3
Mitchell	1
Nebraska	1
Nemaha	2
Neosho	2
New Mexico	1
New York	4
Osage	2
Osborne	1
Pennsylvania	2
Phillips	3
Pottawatomie	13
Rice	2
Riley	88
Russell	1
Saline	1
Sedgwick	3
Shawnee	7
Wabaunsee	9
West Virginia	1

During the calendar year 1878 there were two hundred and thirty-eight (238) students in attendance; of whom 169 were males and 69 were females; the average age being 18.16 years. Fifty-one counties or States were represented, as follows:

Allen	1
Atchison	6
Barton	1
Butler	5
Chautauqua	4
Cherokee	18
Clay	10
Cloud	1
Coffey	3
Cowley	3
Crawford	2
Davis	5
Dickinson	5
Ellsworth	2
Ford	1
Franklin	2
Greenwood	2
Harvey	1
Illinois	1
Indiana	3
Iowa	1
Jackson	2
Jefferson	4
Jewell	1
Johnson	10
Lincoln	1
Lyon	7
Marshall	4
McPherson	3
Missouri	4
Mitchell	4
Montgomery	4
Nemaha	6
Neosho	1
New York	2
Osage	1
Osborne	1
Ottawa	3
Pennsylvania	1
Pottawatomie	10
Republic	1
Rice	1
Riley	64
Saline	2

Sedgwick	1	Wabaunsee	10
Shawnee	7	Wilson	2
Sumner	2	Wyoming	1
Vermont	1		

As a general rule throughout the newer States, about fifty per cent. of the students attending a State institution are residents of the county in which it is situated, thus giving color to the allegation frequently made in Legislatures, that a given institution is mainly for the benefit of the particular locality, rather than for that of the whole State. In 1877, only thirty-eight per cent. of our students were from Riley county, and in 1878, only twenty-seven per cent. In 1877, but sixteen per cent. of the whole number were from Manhattan, and in 1878, but eight per cent.

These facts, taken in connection with the increase of representation by counties and States from forty-five in 1877 to fifty-one in 1878, are the best evidence that the Agricultural College is a State rather than a local institution, and is distinctively an institution for the education of the industrial classes, rather than for the education of the professional classes.

In closing my last public report as President of this institution, and as the matured result of years spent in a persistent study of the difficult problem of industrial education, I desire to express the opinion that the real work of this or any other agricultural college must, from the nature of the case and of the Congressional endowment, be that of furnishing to the future farmer or mechanic an education which will prove as practical and valuable to him in his vocation, as is a medical education valuable to the practicing physician; that the real success of an agricultural college in performing this work will chiefly depend upon the cash value to the farmer or mechanic of the knowledge taught in such college; that the course of study followed in this institution is, with the exception of a few studies, better adapted to secure the object for which the Congressional endowment was given, than that of any other of the existing agricultural colleges; that if three or four of the present fancy branches were stricken out, and others of greater practical value to the farmer, mechanic, or working-woman were substituted, a course of study would be furnished that could not fail to insure a better education for the industrial classes of Kansas than is elsewhere provided in this country; and, finally, that no other State in the Union has it so easily within its power to furnish its working classes with an education fully as valuable to them as is a professional education to the professional classes, provided that this institution steers clear of any and all studies foisted into the course because of "mental discipline" instead of usefulness, or because of "culture" instead of the cash value of knowledge to the workman. In my judgment, if the line of policy adopted by the Board Sept. 3d, 1873, is squarely followed and fully developed, Kansas will have solved the vexed problem of industrial education for the United States.

Very respectfully,

JNO. A. ANDERSON.

Manhattan, Kas., Dec. 20, 1878.

REPORT OF LAND AGENT.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen: I herewith submit my usual report, covering the fiscal year beginning Dec. 1st, 1876, and ending June 30th, 1878:

There were yet unsold, December 1st, 1876, of the lands in my charge	31,461.00 acres.
Returned to market, by action of courts and by settlement with former purchasers, during the term just closed	3,179.47 acres.
Making a total of	34,640.47 acres.
I have sold from the foregoing	4,000.00 acres.
Leaving unsold at this date	30,640.47 acres.

The average price received for the lands sold since last report is $\$5.88\frac{1}{10}$ per acre.

Exhibit A, hereto attached, gives the description of the lands canceled during the term covered by this report, and other facts in reference to the same. To this exhibit I desire to especially call your attention.

At the date of my last report there were in my custody notes of the aggregate value of	$78,883.59
This value has been increased by notes taken on account of sales, as per Exhibit B	17,974.55
Total value	$96,758.14
Decreased by payment of notes, as per Exhibit C	$13,423.39
And by cancellations, as per Exhibit A	11,707.34
A total decrease of	$25,130.73
Leaving now in my custody notes bearing ten per cent. interest, payable annually, of a value of	$71,627.41

The entire receipts in my department, since last report, are as follows:

Cash, from sales of land	$5,550.00
Cash, account of installments, (notes)	13,423.39
Cash, account of interest on notes	5,633.90
Cash, account of compound interest	440.98
Total cash receipts	$25,048.27

For above sums I hold the Treasurer's receipts, which are herewith submitted for your inspection (see package marked "A 1"); and I desire that my accounts may be audited and passed upon by the Board of Regents.

For a more particular detail of above receipts, reference is had to Exhibit D, hereto attached.

Exhibit E gives description of the lands sold, and prices and terms of sale. Exhibit E also shows the detail of notes received on account of sales, the aggregate of said notes being $17,974.55.

For your convenience in making calculations for the future, I have prepared a table, marked Exhibit F, which shows the amounts of principal and interest falling due each month of the ensuing fiscal year, the totals of which are:

Principal	$10,505 88
Interest	5,312 77
Aggregate	$15,818 65

I will add that the amount of principal above named will very certainly be paid in, and there is not much doubt but the interest will also be forthcoming.

During the term since last report, twenty-six patents have been issued, covering 9,272.74 acres of land. Exhibit G, submitted herewith, gives the names to whom patents have issued, and the tracts of land covered by each patent.

There is a marked improvement in sales within the last twelve months, and the future looks bright.

I am, with respect, yours, etc.,

L. R. ELLIOTT, *Agent.*

MANHATTAN, KAS., July 1, 1878.

EXHIBIT A.

Lands canceled between November 30, 1876, and June 30, 1878.

Name.	*How canceled.*	*Description.*	*S.*	*T.*	*R.*	*No. acres.*	*Val. of notes canceled.*
Thomas Leach	Court	S.W. ¼	22	5	6	160	$450 00
M. Solomon	Court	N.W. ¼	23	5	6	160	480 00
M. Solomon	Court	S. ½	18	4	5	304.84	960 00
George T. Chapman	Court	N.E. ¼	9	4	5	160	434 00
H. Farnheim	Court	N W. ¼	17	2	8	160	168 00
L. Higgins	Court	W. ½	9	4	5	320	558 00
H. Trumankath	Court	S.W. ¼	3	3	6	160	360 00
L. Fouth	Q. C. deed	S. E. ¼	25	2	6	160	450 00
Jacob Neese	Surrender	N.W. ¼	22	3	3	160	595 00
H. Augustine	Court	N.E. ¼	8	5	6	160	700 00
C. H. Fellows	Court	N.E. ¼	4	5	6	154.63	367 84
J. Van Nethan	Surrender	N.W. ¼	29	2	5	160	1,400 00
Benjamin Reed	Surrender	All	32	14	2	640	3,500 00
Charles H. Morgan	Surrender	N. E. ¼	23	3	3	160	633 50
Joel Morgan	Surrender	S.W. ¼	23	3	3	160	651 00
Total						3,179.47	$11,707 34

EXHIBIT B.

List of notes taken on account of sales of 1876-7-8 (December, 1876, to June, 1878, inclusive.)

Name.	*No.*	*Amount.*
C. H. Morgan	7	$633 50
Joel Morgan	7	651 00
C. J. Johnson	7	875 00
H. M. Morgan	7	770 00
William Steinfeldt	7	385 00
M. Andredt	7	385 00
J. Forstner	7	700 00
H. P. Meyer	7	770 00
U. E. Elliott	3	300 00
Joel Hersh	24	2,400 00
F. B. Tyers	7	840 00
E. C. Pattee	7	437 00
N. C. Dyes	7	437 00
E. J. McMillan	7	770 00
E. and F. Müller	7	1,260 00
W. E. Nimms	7	680 00
George H. Baker	7	770 00
Milo Huston	1	280 00
J. Wilson	7	840 00
A. B. Gage	7	910 00
S. N. Hurlbut	5	430 00
J. W. Birchmore	7	840 00
H. B. and J. H. Meyer	7	805 00
W. Schiele	7	805 00
Total		$17,974 55

EXHIBIT C.

Amount of notes retired by full payment each month, from November 30, 1876, to June 30, 1878.

Year.	*Month.*	*Amount.*
1876	December	$2,834 33
1877	January	62 00
1877	February	586 19
1877	March	1,500 00
1877	April	160 00
1877	May	205 00
1877	June	414 29
1877	July	664 00
1877	August	610 00
1877	September	1,142 29
1877	October	
1877	November	332 00
1877	December	182 00
1878	January	305 00
1878	February	240 00
1878	March	
1878	April	1,475 00
1878	May	1,485 00
1878	June	1,227 00
	Total	$13,423 39

EXHIBIT D.

Synopsis of receipts on account of Land Department, during the fiscal term ending June 30, 1878.

Month.	*Sales.*	*Principal.*	*Interest.*	*Delin. interest.*	*Monthly amount.*
1876.					
December		$2,834 33	$437 43	$97 98	$3,369 74
1877.					
January	$130 00	62 00	74 60		266 60
February		586 19	84 90	16 84	687 93
March		1,500 00	126 33		1,626 33
April		160 00	192 00	11 87	363 87
May		205 00	235 89	4 45	445 34
June		414 29	370 15		784 44
July		664 00	297 00	99 04	1,060 04
August	125 00	610 00	405 58	20 32	1,160 90
September	110 00	1,142 29	157 86	24 28	1,434 43
October	110 00		1,190 73	1 69	1,302 42
November		332 00	328 40	10 77	671 17
December	500 00	182 00	214 00	10 25	906 25
1878.					
January	100 00	305 00	193 40		598 40
February		240 00	46 00	2 95	288 95
March	235 00		119 48	3 65	358 13
April	1,900 00	1,475 00	93 33		3,468 33
May	1,660 00	1,484 28	438 12	127 79	3,710 19
June	680 00	1,227 00	628 70	9 10	2,544 80
Total	$5,550 00	$13,423 39	$5,633 90	$440 98	$25,048 26

EXHIBIT E.

Description of lands sold, and prices and terms of sale, December, 1876, to June, 1878, inclusive.

Purchaser.	*Description.*	*S.*	*T.*	*R.*	*Acres.*	*Price per acre.*	*Cash paid.*	*No. notes.*	*Amount of notes.*	*Total.*
C. H. Morgan	S. E.¼	23	3	3	160	....	....	7	$633 50	$633 50
Joel Morgan	S.W.¼	23	3	3	160	....	....	7	651 00	651 00
C. J. Johnson	S. E.¼	23	5	6	160	$6 25	$125 00	7	875 00	1,000 00
H. M. Morgan	S.W.¼	23	3	3	160	5 50	110 00	7	770 00	880 00
Wm. Steinfeldt	S.½ N. E.¼	20	1	5	80	5 50	55 00	7	385 00	440 00
M. Andredt	N.½ N.E.¼	20	1	5	80	5 50	55 00	7	385 00	440 00
J. Forstner	S.W.¼	3	3	6	160	5 00	100 00	7	700 00	800 00
H. P. Meyer	N.W.¼	23	1	5	160	5 50	110 00	7	770 00	880 00
U. E. Elliott	N.W.¼	17	2	8	160	5 00	500 00	3	300 00	800 00
Joel Hersh	All of	32	14	1	640	6 25	1,600 00	24	2,400 00	4,000 00
F. B. Tyers	N. E.¼	11	2	8	160	6 00	120 00	7	840 00	960 00
E. C. Pattee	W.½N.W.¼	25	14	2	80	6 25	62 50	7	437 50	500 00
N. C. Dyes	E.½N.W.¼	25	14	2	80	6 25	62 50	7	437 50	500 00
E. J. McMillan	N.W.¼	23	3	7	160	5 50	110 00	7	770 00	880 00
E. and F. Müller	N.W.¼	25	2	5	160	9 00	180 00	7	1,260 00	1,440 00
W. E. Nimms	S. E.¼	6	2	4	160	5 50	200 00	7	680 05	880 05
Geo. H. Baker	S.W.¼	15	14	1	160	5 50	110 00	7	770 00	880 00
Milo Huston	S. E.¼	15	14	2	160	8 00	1,000 00	1	280 00	1,280 00
J. Wilson	N.E.¼	28	2	6	160	6 00	120 00	7	840 00	960 00
A. B. Gage	S.W.¼	14	14	1	160	6 50	130 00	7	910 00	1,040 00
S. N. Hurlbut	N.W.¼	24	3	7	160	5 50	450 00	5	430 00	880 00
J. W. Birchmore	N.W ¼	26	14	1	160	6 00	120 00	7	840 00	960 00
H. P. and J. H. Meyer	S.E.¼	14	1	5	160	5 75	115 00	7	805 00	920 00
W. Schiele	S.W.¼	14	1	5	160	5 75	115 00	7	805 00	920 00
Total	....				....	....	$5,550 00	.....	$17,974 55	$23,524 55

EXHIBIT F.

Amounts falling due during the fiscal year ending June 30, 1879.

Month.	*Principal.*	*Interest.*	*Amount.*
1878.			
July	$144 00	$86 40	$230 40
August	600 00	252 00	852 00
September	834 07	368 36	1,202 43
October	3,056 85	1,563 42	4,620 27
November	400 00	420 64	820 64
December	260 00	108 00	368 00
1879.			
January	285 84	100 32	386 16
February	685 00	186 50	871 50
March	645 00	471 00	1,116 00
April	970 00	663 10	1,633 10
May	1,280 12	570 03	1,850 15
June	1,345 00	523 00	1,868 00
Total	$10,505 88	$5,312 77	$15,818 65

EXHIBIT G.

Statement of patents issued since last report, to June 30, 1878:

To H. C. Spangle, N.W.¼ of section 14, town 3, range 3; 160 acres.

To Francis McNulty, N.E.¼ of section 28, town 2, range 2; 160 acres.

To Adolph Sirnis, jr., N.E.¼ of section 9, town 5, range 6; 160 acres.

To Charles Allyn, S.E.¼ of section 8, town 5, range 6; 160 acres.

To John A. Hewson, N.W.¼ of section 15, town 5, range 6; 160 acres.

To James A. Thompson, S.W.¼ of section 9, town 5, range 6; 160 acres.

To Nicholas B. Thompson, S.E.¼ of section 9, town 5, range 6; 160 acres.

To James Clark, S.W.¼ of section 23, town 5, range 6; 160 acres.

To J. Spooner, N.E.¼ of section 31, town 2, range 4; 160 acres.
To James Kindlen, N.E.¼ of section 14, town 9, range 5; 160 acres.
To John Mueller, S.E.¼ of section 3, town 3, range 6; 160 acres.
To Geo. Wohlwend, W.½ of section 23, town 2, range 6; 320 acres.
To Geo. Wohlwend, all of section 26, town 2, range 6; 640 acres.
To James Kennedy, S.E.¼ of section 30, town 2, range 3; 160 acres.
To Lewis Mead, N.W.¼ of section 1, town 13, range 2; $161\frac{41}{100}$ acres.
To Wm. Wainwright, S.E.¼ of section 8, town 9, range 6; 160 acres.
To Robt. Wright, N.W.¼ of section 20, town 9, range 6; 160 acres.
To B. F. Rinehart, N.E.¼ of section 2, town 13, range 2; $161\frac{17}{100}$ acres.
To John B. Anderson, all of section 17, town 14, range 4; 640 acres.
To John B. Anderson, all of section 19, town 14, range 4; $630\frac{10}{100}$ acres.
To John B. Anderson, N.W.¼ of section 20, town 14, range 4; 160 acres.
To Jacob Stotts, N.W.¼ of section 11, town 13, range 2; 160 acres.
To John W. Chandler, S.W.¼ of section 20, town 14, range 2; 160 acres.
To Noah Engle, N.E.¼ of section 20, town 14, range 2; 160 acres.
To Adam Korn, W.½ of section 15, town 14, range 2; 320 acres.
To W. C. Lobenstein, N.W.¼ of section 17, town 2, range 2; 160 acres.
To W. C. Lobenstein, N.E.¼ of section 35, town 2, range 3; 160 acres.
To W. C. Lobenstein, W.½ of section 7, town 2, range 4; 320 acres.
To W. C. Lobenstein, N.W.¼ of section 11, town 2, range 6; 160 acres.
To W. C. Lobenstein, E.½ of section 25, town 2, range 7; 320 acres.
To W. C. Lobenstein, S.E.¼ of section 3, town 4, range 5; 160 acres.
To W. C. Lobenstein, S.E.¼ of section 10, town 4, range 5; 160 acres.
To W. C. Lobenstein, N.E.¼ of section 10, town 6, range 5; 160 acres.
To W. C. Lobenstein, S.E.¼ of section 10, town 6, range 5; 160 acres.
To W. C. Lobenstein, W.½ of section 11, town 6, range 5; 320 acres.
To W. C. Lobenstein, S.½ of section 4, town 10, range 6; 320 acres.
To W. C. Lobenstein, N.E.¼ of section 11, town 13, range 2; 160 acres.
To W. C. Lobenstein, S.W.¼ of section 9, town 14, range 4; 160 acres.
To W. C. Lobenstein, all of section 27, town 14, range 4; 640 acres.
To W. C. Lobenstein, N.E.¼ of section 23, town 3, range 7; 160 acres.

Total acres, $9{,}272\frac{74}{100}$.

REPORT OF LOAN COMMISSIONER.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: Herewith find biennial report of the investment of the endowment fund of the Kansas State Agricultural College, as shown by the records of this office, commencing December 1, 1876, and including June 30, 1878:

INVESTMENT OF ENDOWMENT FUND,

From December 1, 1876, to June 30, 1877, inclusive.		
Invested in real-estate securities	$11,052 50	
Invested in school bonds	17,960 00	
Invested in refunding tax, as per act of Legislature, March 5, 1877	5,000 00	
		$34,012 50
From July 1, 1877, to June 30, 1878, inclusive.		
Invested in school bonds		10,845 30
Total amount invested		$44,857 80

All of which is respectfully submitted, with a request that a committee be appointed to examine the books and papers of the office, that my accounts be audited and approved.

I am respectfully,

M. L. WARD,

Loan Commissioner Kansas State Agricultural College.

MANHATTAN, KAS., June 30, 1878.

REPORT OF THE TREASURER.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I herewith present the following biennial report, covering the period from December 1st, 1876, to June 30th, 1878, inclusive.

The receipts and disbursements from December 1st, 1876, to June 30th, 1877, inclusive, were as follows:

INTEREST ACCOUNT.

Balance due Treasurer as per report, November 30th, 1876		$3,407 14
Paid out on approved vouchers, for account of Farm Department	$864 09	
Mechanical Department	595 57	
Chemical Department	269 79	
Botanical Department	3 20	
Music Department	12 50	
Sewing Department	28 26	
Printing Department	121 49	
Telegraph Department	27 80	
Entomological Department	3 50	
Woman's Industrial Department	95	
Kitchen Laboratory Department	30 50	
Land Department	598 10	
General expense	2,010 35	
Salary	10,693 05	
		15,259 15
Total		$18,666 29
Received from Horticultural Department	$385 58	
Rents	66 60	
Accrued interest on securities	708 10	
Interest on land-sale notes	1,652 44	
Interest on securities	9,082 34	
		11,895 06
Balance due Treasurer, June 30, 1877		$6,771 23

LAND-SALE ACCOUNT.

Balance in hands of Treasurer, November 30th, 1876	$8,162 19	
Received from sales of land	5,891 81	
Received from payment of securities	26,957 78	
		$41,011 78
Paid out on approved warrants for real-estate securities	$11,052 50	
School bonds	17,960 00	
Refunding tax	5,000 00	
		34,012 50
Balance in hands of Treasurer, June 30th, 1877		$6,999 28

The receipts and disbursements from July 1st, 1877, to June 30th, 1878, inclusive, were as follows:

INTEREST ACCOUNT.

Balance due Treasurer, June 30th, 1877		$6,771 23
Paid on approved vouchers on account of Horticultural Department	$163 88	
Farm Department	360 54	
Mechanical Department	18 98	
Chemical Department	121 56	
Music Department	1 80	
Sewing Department	5 00	
Printing Department	169 70	
Telegraph Department	22 10	
Library Department	6 00	
Entomological Department	123 40	
Woman's Industrial Department	29 26	
Land Department	150 45	
Loan Department	5 40	
General expense	1,939 00	
Salary	14,853 04	
		17,970 11
Total		$24,741 34
Received from interest on securities	$10,761 74	
Accrued interest on securities	1,280 77	
Interest on land-sale notes	4,422 44	
Rents	99 10	
		16,564 05
Balance due Treasurer, June 30th, 1878		$8,177 29

LAND-SALE ACCOUNT.

Balance in hands of Treasurer, June 30, 1877	$6,999 28
Received from sales of land	13,081 58
Received from payment of securities	26,157 97
Total	$46,238 83
Paid out on approved warrants for school bonds	10,845 30
Balance in hands of Treasurer, June 30th, 1878	$35,393 53

Securities in hands of Treasurer, June 30th, 1878.

School bonds	$120,274 78
Real-estate securities	25,784 96
Total	$146,059 74

Statement of Interest coming due on Securities in hands of Treasurer.

July, 1878	$23 50
December, 1878	230 00
February, 1879	192 00
June, 1879	9,483 21
Total	$9,928 71

Statement of Securities coming due in hands of Treasurer.

July, 1878	$235 00
February, 1879	1,320 00
June, 1879	15,827 00
Total	$17,382 00

STATE APPROPRIATIONS.

Receipts and Disbursements for Fiscal Year ending June 30, 1878.

Received from State Treasurer for account stone barn	$4,000 00
Paid approved vouchers	4,000 00
Received from State Treasurer for account finishing Mechanical and College buildings	$1,000 00
Paid approved vouchers	1,000 00
Received from State Treasurer for account fire extinguishers	$500 00
Paid approved vouchers	500 00
Received from State Treasurer for account sidewalks	$300 00
Paid approved vouchers	300 00

COLLEGE WARRANTS, 1870, ACCOUNT.

Received for College bonds sold, land-sale account, in accordance with act of Legislature, March 16, 1877	$11,000 00
Paid College warrants, and accrued interest	11,000 00

REFUNDING TAX ACCOUNT.

Appropriation from land-sale account, as per act of Legislature, March 5, 1877	$5,000 00
Paid drafts of State Treasurer	3,399 48
Balance in hands of Treasurer, June 30, 1878	$1,600 52

All of which is respectfully submitted, with a request that you appoint a committee to examine my papers up to and including June 30, 1878, that my accounts may be audited, and balances struck at that date.

E. B. PURCELL,
Treasurer Kansas State Agricultural College.

MANHATTAN, KAS., June 30, 1878.

REPORT OF DEPARTMENT OF PRACTICAL AGRICULTURE.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I have the honor to offer for your consideration the following outline of operations in the Farm Department for the seventeen months ending April 30th of current year.

The course of instruction given in this department has not been materially changed since my last report. These studies embrace the following subjects: Elementary Agriculture, given in lectures, and including Stock-Breeding, History and Characteristics of Breeds, farm implements and simple tillage; Advanced Agriculture, (also given in lectures, embracing rotation of crops, manures, and cognate subjects), Physiology and Hygiene; and to a class of young ladies, a course of lectures on Dairy Practice. In addition to these, the regular studies of the department, I have taught during the spring term of 1877, a class in physical geography, using Guyot's text-book, and during a half of the last term, a class in U. S. history.

In the classes in practical agriculture and physiology, substantially the same ground has been gone over as that mentioned in previous reports. In the elementary class in agriculture a large share of the work of the term has been devoted to stock-breeding and related topics, in the belief that stock-raising is a subject of special interest to Kansas farmers. The new barn and comfortable yards adjacent, have rendered valuable service in our studies of this subject, as by these I have been able to give the class a number of daily studies of the different breeds making up the College herd, without danger of interruption by the elements. The advanced class in agriculture has devoted the time chiefly to the subjects of farm experiments, manures, rotations, and farm buildings, having special reference to the wants of Kansas farmers

The physical geography class passed through in a very thorough manner Guyot's large book.

In U. S. history the end of the term found the class just through the war of the Rebellion, having considered the subject from the discovery of America, taking Anderson's Grammar School History as the text-book.

The whole number of students in the different classes in my department, during the two years past, is shown by the following table:

Year.	*Physiology, 2d year.*	*Practical Agriculture, 2d year.*	*Practical Agriculture, 4th year.*	*Physical Geography, 3d year.*	*Household Economy, 3d year.*	*U. S. History, 1st year.*
1876-7	98	41	4	4	10	....
1877-8	40	12	4	....	1	27
Total	138	53	8	4	11	27

It gives me pleasure to report the uniform attention and zeal shown by the students of this department. This is all the more a pleasure to me, as most of their studies are distinctively agricultural, and much out of the line of the ordinary college course.

THE FARM.

In its general features, the season of 1877 bore a striking resemblance to that of 1876. Like that season, the past has been peculiarly favorable to all spring grains, while from the excessive moisture winter wheat has suffered greatly from the rust. Unfortunately I have no experience with winter wheat to report for 1877. Our crop of twenty acres, after having been seeded, in some parts twice, and as often destroyed by grasshoppers, was finally given up, and the ground, in part, sown to winter rye. For a full statement of the crops grown, acreage, yield per acre, and cost of each bushel, you are respectfully referred to the subjoined table.

Crops grown.	*No. of acres.*	YIELD PER ACRE		COST.		*Total amount.*
		Bushels	*Tons.*	*Bushels.*	*Tons.*	
Corn	27½	48	....	$0 16	....	1,320
Wheat (spring)	4½	15.8	....	46	....	71.1
Rye	8	17	....	36	....	136
Oats	10	40	....	12	....	400
Barley	11½	13	....	47	....	149.5
Millet	19	....	1.64	....	$2 51	31.16 ts.

In the columns under "cost," account is taken only of the cost of seed and labor, taxes, and the use of the land not having been considered.

The question of the actual cost of producing a bushel of corn in ordinary field culture is often discussed by the agricultural press. Our experience during the past three years may throw some light on this subject. In 1875, our corn yielded 27½ bushels per acre, and cost 20 cents per bushel; in 1876 the yield was 55⅝ bushels, costing in production 12½ cents per bushel; the past season it will be seen, with a yield of 48 bushels, the cost of each bushel was 16 cents. The average cost of producing each bushel of corn grown on the College farm during the past three years, has been 16.1 cents.

I am well satisfied that during such favorable seasons as 1876 and 1877, upon good land, not excessively foul, corn may be produced in this section at a cost not exceeding thirteen cents. Further, by attention to a few particulars, now generally neglected, it is within the power of our farmers to considerably reduce even this low cost of production. And, 1st, more care should be given to the selection of seed. Corn may be bred and improved just as well as short-horns, and much more rapidly. In the selection of seed, not only should nothing but the best ears be saved, but those which have the same general characteristics as to color and size of grain should have the preference, so that they will breed "true." Then, if a portion of the field, or a separate plat, be given exceptionably good treatment, and all feeble and unproductive stalks have their "tassels" removed as soon as they appear, a surprising improvement will soon be noticed. 2d. Our Kansas farmers cannot afford to neglect the smaller kinds of corn generally grown in the Eastern States. A considerable portion of our corn ought always to be of one of these sorts, for the reason that they ripen in four to six weeks less time than is required by the larger dent sorts. I am convinced that if in 1874 our corn had been of this sort, a fair crop would have been grown. Moreover, under the same treatment, the small corn will yield nearly or quite as well as the large dent. Last season, upon the College farm, five and one-half acres of the small King Philip variety, planted June 9th, yielded forty-four bushels per acre; while twenty-two acres of yellow dent, planted May 8th, gave a yield of only forty-nine bushels. The cost of each bushel of the King Philip and the dent were about the same.

The light yields of barley and millet, shown in the above table, are explained by the fact that the seed, procured from outside parties, proved to be lacking in vitality, a considerable portion failing to germinate.

The total cropping upon the farm the present season is, in round numbers: Of winter wheat, 16 acres; corn, 23 acres; oats, 22 acres; millet, 6½ acres; farm grass pasture, 18 acres. All these crops are now, without exception, in very promising condition. I expect to make a report upon these, supplementary to this, at the close of the present year.

Stock.—Within the seventeen months covered by this report, very valuable additions have been made in the natural way to our herd of neat cattle. All told, the herd has been increased by eight head of pure-bred animals, divided among the different breeds as follows: Short-horns, three heifers and two bulls; Jerseys, one heifer and one bull; and Galloways, one heifer. The herd at this writing numbers twenty head of pure-bred animals—of which short-horns number eleven females and two bulls; Jerseys, two females and two bulls; and Galloways, two females and one bull. It is interesting to remark, as showing the rapidity with which a sound herd multiplies, that sixteen of these animals have sprung from the four cows owned by the College in the spring of 1874, and in addition we have sold of their offspring six head of pure-bred animals.

Our herd of swine has not changed materially since my last report. It now numbers ten head of breeding sows and three boars, of which three sows and one boar are of the Essex breed and the remainder Berkshires. There are in addition to these, three small litters of young pigs. Three choicely-bred Berkshires from the well-known herd of Albert Crane, Durham Park, Kansas, are all the additions made to our herd of swine by purchase since my last report.

Considering the size of the herd, my sales of stock have been quite liberal, and the demand for pigs especially has been greatly in excess of the supply. I have been able to fill less than half of the orders received for pigs, and for several months past we have not had a single animal for sale. The number of pigs sold for breeding purposes in the time covered by this report is nineteen, thirteen Berkshires and six Essex. The average price received for the Berkshires has been $20.15, and for the Essex $9.66. From the sale of pigs alone, $320 were received. From a litter of nine Berkshires I received $134, and retained two of the pigs in our own herd. I need hardly say that these are profitable prices so far as the College is concerned, and, judging from the numerous testimonials I have received from purchasers, the stock has been appreciated.

Our sales of cattle have not been as numerous as of swine, although quite as important. I have sold for breeding purposes, two short-horns, two Devons, and one Jersey heifer. The average price of the short-horns was $200, of the Devons $56.50, and $120 was had for the Jersey heifer. From the sale of cattle for breeding purposes the farm has received $633.

BUILDINGS.—Since last November the new barn has been in constant use, and I am prepared to speak positively of its merits. Accustomed as our herd was to an old shed which leaked like a sieve, and which after every rain was more than ankle-deep in the most tenacious mud, we can appreciate the blessings of warm, dry stables, convenient granaries and bays, and dry, roomy yards, such as the farm now has. The plans of this barn have before received your approval, and I need not repeat them here. A cut of the barn and complete description appeared in the *Industrialist* of Feb. 23d, and in *Moore's Rural New Yorker* of April 13th. The plans have been highly commended by many of our best farmers, and speaking after six months' use, I should hardly know how to suggest a single important change for the better. Around the barn a large amount of grading has been done, and a roomy barn-yard surrounded on three sides by a picket-fence and on the north by a tight board fence, has been completed. For this the corn-cribs have been removed to near the new barn, and the platform scales changed to a position convenient to both entrances of the barn. We have also dug two good wells, one in field No. 1, the other in the barn-yard; in the latter an excellent spring was found at the depth of five feet.

MACHINERY.—Early in the spring of 1877, the Hoosier Drill Co., of Milton, Indiana, presented the farm, for trial, one of their corn drills. This machine has had a thorough trial through two seasons, and I am prepared to commend it heartily to those of our farmers who have fallen into the modern fashion of planting in drills. This machine is durable and very well constructed, and it distributes the corn so evenly as to leave nothing to be desired in this respect. Considering that our own experiments, and all others with which I am acquainted, show an increased yield by the method of drilling, of from 10 to 25 per cent., our farmers whose land is in proper condition will do well to give this machine a trial.

More recently I have received from Deere, Mansur & Co., of Kansas City, one of Baird's "Limber Jack Harrows," but have been unable, as yet, to give it a satisfactory trial. During the year I have tested with the dynamometer, for manufacturers and others, a considerable number of plows, reapers, and other farm machinery, and hold myself in readiness to continue to perform such work.

Experiments.—In the spring of 1871, a portion of field No. 3 was laid off in twenty experimental plats and planted with corn, for the purpose of testing the value of gypsum, and different methods of planting. The whole experiment came to a sudden end during a violent storm late in May, which, besides tunneling huge gullies through the piece in several cases, well-nigh destroyed whole plats.

In the fall of 1877, twenty-four experimental plats were laid off in field No. 4, and sowed in winter wheat, for the purpose chiefly of testing upon this crop the value of farm-yard manure, ashes and gypsum, and gypsum alone. Four of these plats were devoted to as many kinds of wheat and rye, received from the Department at Washington. In this experiment, for the purpose of comparison, every alternate plat receives no special treatment; the remaining plats are treated with fertilizers in a regular order. The experiment is a very interesting, and at this time a very promising one. I hope to make a full report upon this and other experiments in due time.

Very respectfully,

EDWARD M. SHELTON,

Prof. Practical Agriculture and Supt. Farm.

Manhattan, Kas., May 20, 1878.

SUPPLEMENTAL REPORT.

Gentlemen: Your attention is respectfully invited to the following report of operations in the Farm Department for the year ending November 30th, 1878.

At the meeting of the Board held in May of this year, I reported quite fully upon the condition and work of the classes in this department, leaving little to be said now under this head. During the past half-year I have taught: (1) A class in Advanced Agriculture, consisting of ten students, of the fourth year; (2) two large classes in Physiology, numbering, all told, eighty-five students of the second year; (3) a short course of lectures on Dairy Husbandry, delivered to a class of three young ladies, of the third year; (4) during a considerable part of the term I have given daily drill in Rhetoricals to a part of the third-year class.

In regard to these studies I can say but little in addition to what has been said before. Changes have been made in these courses of study from time to time, as experience and the condition of the different classes has suggested; but, in the main the object has been as heretofore, to make these studies practically useful to the student in the every-day affairs of life. It gives me great pleasure to be able to report the excellence of the deportment of the students of this department. Their diligence and attention have been very good, and the progress made quite satisfactory.

THE FARM.

The past season has generally borne a striking resemblance to that of the preceding year, though not in its effect upon the growth of all classes of farm crops. The season, in this section, will be long remembered on account of its great yields of wheat, grass, and the small grains generally, as well as for the light yield of corn, considering the season, and the great promise of the growing crop. The crops of winter wheat and hay have been the largest obtained during my administration, and the cost of producing these has been greatly below that of any preceding year. Our crop of corn, from some unexplained cause, has disappointed us greatly in husking. Instead of the very large yield which it promised, the very moderate yield of forty-five bushels per acre is all that I have to report. It has occurred to me as at least a plausible explanation of this partial failure of the corn crop, that the very severe rain storms occurring in July may have injured the organ of reproduction of the plants just then most active—resulting in this permanent injury to the crop.

Below is given a complete tabular statement of the number of acres, the yield per acre, and the cost of the different crops grown upon the College farm during 1878:

CROPS GROWN.	No. bushels..	YIELD PER ACRE.		COST.	
		Bushels.	*Tons.*	*Bushels.*	*Tons.*
Corn	23	45	....	13c	....
Wheat (winter)	16	29	....	40c	....
Rye	1	34	....	38c	....
Oats	22	40	....	....	....
Millet	6½	....	2¼	....	$1 72
Clover and timothy	3½	....	4 7-10	....	1 39

The yield of oats in the above table is estimated. On account of the damage sustained from storms, and because a portion of the oats was fed in the sheaf, I am unable to make a more accurate statement of this crop. By the term "cost" in the above table, is to be understood the simple cost of production, exclusive of taxes and interest on investment.

STOCK.—The College herd of neat stock now consists of three breeds, Short-horns, Jerseys, and Galloways; in numbers as follows: Short-horns, two bulls and twelve females; Jerseys, two bulls and three females; Galloways, one bull and three females; a total of five bulls and eighteen females; all pure-bred animals, and nearly all at the breeding age. Of the fourteen short-horns, twelve are the direct descendants of the two cows owned by the College in 1874; and, in addition, three of this same family have since been sold from the College farm. Our Jerseys have proved quite as prolific as the short-horns; four of those now upon the farm, and two, a bull and heifer, sold, are the direct descendants of the single Jersey cow owned by the College in 1874, and now dead some three years. I have to report a single casualty for the two years last past. The short-horn bull, Second Duke of Jubilee, died in December last, from an attack of inflammation of the stomach.

Our herd of swine now consists of two breeds, Berkshires and Essex, chiefly the former. Of Essex pigs, we have one boar and two brood sows, and ten pigs under five months old. The herd of Berkshires is now quite large, numbering two aged boars and eight brood sows, and twenty-two pigs under five months old. This herd, in point of quality and breeding, is now reckoned one of the most valuable in the West.

Of the College herd in general it is sufficient to say that it is now in perfect health and good breeding condition, and gives promise of great usefulness in the future.

For a complete list of all stock, together with tools, machinery, and personal property generally belonging to this department, you are respectfully referred to the inventory now in the hands of your Secretary.

EXPERIMENTS ON THE COLLEGE FARM.

FERTILIZERS IN WHEAT.—In field No. 4, west of the old College barn, twenty plats were staked off for the purpose of testing farm-yard manure, ashes and plaster, all applied as a top-dressing to winter wheat. This field has not been manured since 1872 or 1873, and since then has been cultivated continuously, growing a crop of grass or millet every year. The soil is a heavy clay loam, one to four feet in depth, resting on a subsoil of tenacious clay. Each plat was two rods in width by four in depth, and a double row of these ranged north and south with the slope, which was quite gradual and from south to north. The plats were separated by vacant spaces two feet in width, which were kept free from weeds by hoeing, and the plats to which fertilizers were applied, in every case alternated with plats which received no special treatment, and which for convenience we call "nothing plats." All the fertilizers were applied about the time of seeding (September 15th), three plats receiving farm-yard manure at the rate of ten cords of well-rotted manure per acre, three unleached ashes at the rate of fifty bushels per acre, two plaster at the rate of ten bushels per acre, and one ashes and plaster in the same proportions as when applied singly.

On account of a partial failure in seeding, one of the nothing plats, and one to which ashes was applied, are rejected from the following computations. The yield of the different plats per acre, and the proportions of the straw and grain, are given in tables Nos. 1 and 2.

TABLE NO. 1.

Material used.	*Yield per acre—Bushels.*	*Yield per acre straw—Pounds.*	*Straw, lbs. to 1 bushel grain.*
Manured plats	38.8	6,311	162
Nothing plats	39.7	6,249	157
Ashes plats	42.8	6,920	161
Plaster plats	38.7	6,236	160
Ashes and plaster	37.1	6,630	178

In table No. 2, the yield of the differently-treated plats is given as before, and in addition the yield of the nothing plats *adjacent* these. Thus the "adjacent," in "nothing plats adjacent," in this table, refer to the plats in the column above.

TABLE NO. 2.

Material used.	*Yield per acre—Bushels.*	*Yield per acre straw—Pounds.*	*Straw, lbs. to 1 bushel grain.*
Manure	38.8	6,311	162
Nothing plats adjacent	39.6	6,232	157
Ashes	42.8	6,920	161
Nothing plats adjacent	39.4	6,640	168
Plaster	38.7	6,236	161
Nothing plats adjacent	38.8	6,220	160
Ashes and plaster	37.1	6,630	178
Nothing plats adjacent	42.8	6,330	148

The result of this experiment corresponds very closely with a similar one made upon the College farm in 1876. It seems to show that upon our uninjured prairie soils, and during such favorable seasons as have lately favored this State, manure upon wheat is of doubtful value. Had the soil been much less fertile naturally, or had the season been very different, especially had it been dry, very different results might have been expected. The entire crop of the field in which this experiment was conducted, was a very large one, averaging 36½ bushels per acre, the straw averaging nearly five feet in height. The variety employed was the Red May.

Experiment in the Growth of Corn.—In this experiment eight strips or belts were staked off through the center of that part of field A devoted to corn the past season. Each belt occupied 1-20 of an acre; every alternate strip had the suckers carefully removed on June 10th and July 2d, the plants in the remaining strips being allowed to grow according to their natural inclinations. The result of this experiment is shown in table No. 3.

TABLE NO. 3.

Plats.	*Yield of plats in lbs.......*	*Yield per acre in bushels of 70 lbs., ears.....*	*Plats.*	*Yield of plats in lbs.......*	*Yield per acre in bushels of 70 lbs., ears .....*
Plat A—natural	181	51.7	Plat E—natural	159	45.4
Plat B—suckered	169	48.2	Plat F—suckered	154	44.0
Plat C—natural	170	48.5	Plat G—natural	182	52.0
Plat D—suckered	160	45.7	Plat H—suckered	159	45.5

In table No. 4 the yields of the suckered and natural plants belts are grouped for comparison.

TABLE NO. 4.

	Aver. yield of plats, lbs.	*Aver. yield per acre in bushels of 70 lbs...*
Natural	173	49 4-10
Suckered	160½	45 9-10
Increased yield of natural plats	12½	3 5-10

The ground upon which this experiment was conducted was selected because of the uniformity of its soil. The results seem to show, however, that the soil became progressively poorer from plat A to plat H. A glance at these tables will show that the removal of the suckers was a positive injury to the crop, and that, not in occasional cases, but uniformly through the series, there being only one exception to the rule of the experiment, that the "natural" plats yielded larger than either of the suckered plats adjoining. It would seem from this that the practice of removing the suckers from the growing corn is not well founded.

Experiments with Seed Corn.—For some years it has been a prominent object of this department to improve our field corn from year to year, and give to it the greatest possible uniformity with respect to valuable qualities. To this end we have carefully selected our seed each year, having in mind the stock breeder's maxim, "Breed only from the best." Our success in this endeavor has amply repaid the outlay, but without doubt it would have been much greater, had we at all times felt quite certain what constituted the best. Among the problems that have always arisen at the time of selecting such corn, is the question, Which is the most profitable corn for the farmer—that having the largest or the smallest number of rows of grains on the cob? To test this matter as far as possible, and in order to study the relation between the number of rows of corn, and size of ear and cob, fifty ears of corn were selected of each of the following sorts: 10, 12, 14, 16, 18, 20, 22 and 24-rowed. The kind of corn used mainly in this experiment was the large white "dent," which was selected from a commercial crib in this city. In making these selections the discovery was soon made that the most unusual sorts were those of 10, 22 and 24 rows and upwards, ears having 26 rows being very rare indeed.

Every ear of each sort was measured at its middle diameter, and length, and each lot was weighed, shelled, and then the cobs weighed separately. From data thus obtained table No. 5 is prepared.

TABLE NO. 5.

No. of rows per ear.	*Average diameter of ear—Inches*	*Average length of ear—Inches.*	*Average weight of ear—Pounds.*	*Average weight of cob—Pounds.*	*Average weight of shelled ear—Pounds.*	*No. of ears to one bushel of 70 pounds.*	*Shelled ears to one bushel of 56 pounds.*
Ten	1.97	8.82	.62	.10	.52	112.9	107.6
Twelve	2.1	9.44	.77	.13	.64	90.9	87.5
Fourteen	2.17	9.71	.84	.13	.71	83.3	78.8
Sixteen	2.22	9.03	.82	.12	.70	85.3	80
Eighteen	2.3	8.78	.85	.13	.72	82.3	77.7
Twenty	2.34	8.31	.81	.12	.69	86.4	81.1
Twenty-two	2.44	8.03	.81	.12	.69	86.4	81.1
Twenty-four	2.47	7.48	.78	.12	.66	88.4	84.8

The effect of the number of rows upon the yield per acre is shown in table No. 6. In this table it is assumed that the yield of the ten-rowed sort, per acre, is forty bushels of ears of seventy pounds, or, leaving out the cobs, the same number of shelled bushels of fifty-six pounds. The yield of all the other sorts is found by simple proportion thus:

$$\overbrace{.62}^{\text{Weight of 10-rowed ears.}} : \overbrace{.77}^{\text{Weight of 12-rowed.}} :: \overbrace{40}^{\text{Yield of 10-rowed.}} : \mathbf{49.6}\ \text{bushels} =$$

the yield of the twelve-rowed sort.

TABLE NO. 6.

	10 rowed.	*12 rowed.*	*14 rowed.*	*16 rowed.*	*18 rowed.*	*20 rowed.*	*22 rowed.*	*24 rowed.*
Yield per acre in bushels of ears	40	49.6	54.1	52.9	54.8	52.2	52.2	50.3
Yield per acre in bushels, shelled	40	49.2	54.6	53.6	55.3	53	53	50.7

It is not pretended that these tables show positively what is and what is not the best kind of corn. For example, the kind of corn shown here to be the most profitable, might *in the field* prove the least hardy or prolific. What these tables do is to establish a strong probability, and this becomes something more than a probability when we reflect that sub-varieties of corn are not based upon the number of rows of kernels upon the cob. There is no sort of corn with which I am acquainted, in which variations as to the number of rows of grains, greater or less than those of the tables, do not occur. It is therefore a matter of very great importance to the farmer that he understands what arrangement of corn upon the cob gives the best results, and it is believed that these tests will not prove uninstructive under this head.

The facts brought out by this examination are as follows:

1. As the number of rows of corn on the cob increases, the diameter of

the ear increases, while its length increases only until the medium number of rows is reached, when it rapidly declines.

2. The weight of the ear, and to some extent the weight of the cob, and in a marked degree the weight of the shelled ear, increase until the medium rows are reached, when they rapidly decline.

3. The variation in the weight of the cobs was only slight, but the heaviest shelled ears were found upon the heaviest cobs.

4. The number of whole and shelled ears required for a bushel is greatest with the light-rowed, and fewest with medium-rowed sorts.

5. The average of the eight lots employed shows that a bushel of 70 pounds contains $4\frac{7}{10}$ ears (equal to $3\frac{1}{10}$ pounds of shelled corn) more than a bushel of 56 pounds of shelled corn.

6. The obvious corollary of the above is, that the most profitable corn is that having a medium number of rows to the ear.

Large Dent and Small Corn.—We have grown both of these sorts of corn in the past year, and in the following proportions: Yellow dent, 16½ acres; King Philip, 6¼ acres. The dent yielded $42\frac{6}{10}$ bushels per acre, costing 12¾ cents per bushel. The yield of the King Philip, upon poorer soil, was 50 bushels, costing 13 cents. The only difference in the treatment of the two sorts was, that the King Philip was drilled, the drills being 3 feet 9 inches apart; while the dent was planted in hills 3 feet 9 inches each way. The King Philip was quite ripe by August 10th; the dent requiring fully one and one-half months longer. These facts seem to me to emphasize what I have urged in previous reports, namely, that our farmers should plant more largely of the smaller sorts of corn, and not alone because they mature early, and thus enjoy almost entire immunity from drouth and grasshoppers, but animals, without exception, greatly prefer this small corn to the large.

The Grasses.—After a very wide experience with a large number of "tame grasses," we have settled upon orchard grass, Kentucky blue-grass, timothy, alfalfa, and clover as being the best adapted to the wants of our State. All these should be seeded liberally, to counteract the tendency to grow in bunches; and only old, rich, and well-prepared soil should be used. We have during the year mowed two crops of hay from orchard grass, of this year's seeding; and four crops, of fully one and one-half tons of hay, from an old-seeded alfalfa piece.

Seed Wheat.—In addition to the Early May chiefly grown, we have experimented with the Golden Straw and Silver Chaff varieties, of which sixty square rods each were grown, and with Arnold's Gold Medal, upon a somewhat smaller scale. On account of an error in threshing, I am unable to give accurately the yield of these last three sorts. All gave very large crops of superior white wheat. On account of its quality and compact habit of growth, the Golden Straw promises to be an acquisition to the wheats of Kansas. Of the other sorts, I prefer not to speak until after a more extended experience. The Golden Straw and Silver Chaff varieties were received from the department at Washington.

In concluding this report, I respectfully request that I may be allowed at least $100 in continuing and extending the experimental work of this department, in the belief that it may be made of great service to the farmers of the State.

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 1, 1878.

RECEIPTS.

Cash sales of stock and produce	$944 40
420 bushels wheat on hand, @ 60c	252 00
1860 " corn " " " 18c	334 80
500 " oats " " " 15c	75 00
30 " rye " " " 20c	6 00
40 tons of hay and millet, @ $4.00	160 00
Amount expended in experiments	60 50
" " " permanent improvements	52 00
" " " roads and college grounds	37 45
Increase of live stock	840 00
	$2,762 15

EXPENDITURES.

Amount expended in stock and crops	$1,034 97
" " " experiments	60 55
" " " permanent improvements	52 00
" " " repairs, fences and buildings	79 63
" " " implements and harness	85 15
" " " roads and College grounds	37 45
Produce on hand Dec. 1st, 1877	549 00
	$1,898 75
Balance	863 40
	$2,762 15

Respectfully submitted.

EDWARD M. SHELTON,
Professor of Agriculture and Supt. of Farm.

MANHATTAN, KAS., Dec. 31, 1878.

REPORT OF THE HORTICULTURAL DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: This report covers a period from November 30th, 1876, to June 30th, 1878.

The instruction during this period has embraced first, in the collegiate year of 1876 and 1877, the teaching of a class in Botany, consisting of twenty-two students; a class of eight in Butler's Analogy. A course of lectures was given to a class of fifteen students in Horticulture, and a class of two was instructed in Landscape Gardening.

During the present collegiate year a class of twenty-two students has been taught in Botany. A course of lectures on Entomology has been given to a class of eighteen. A course of lectures on Landscape Gardening has been given to twenty-two students; and to this course was added as an essential qualification for the landscape gardener, instruction in the elements of Topographical Drawing; and a class of five, embracing the senior, has been taught in Zoölogy.

As means of illustration in the Botanical and Horticultural Department, we have obtained through the Agricultural Department at Washington, a collection of seeds, some of which have been planted and others bottled and labeled for the use of future classes. We have also received from the same source a valuable collection of dried-plant specimens, a few of which are European, but most of them are from the Western mountains and plains. These have all been carefully mounted and put in shape for future use. We have also secured during the past year a good collection of native Kansas wood specimens, and by exchange, through the kindness of Prof. R. F. Kedzie, a very finely-prepared collection of Michigan wood specimens. We have been able also to secure, at a very small expense to the College, a rude cold-frame, which will answer important purposes for illustration. A good beginning has been also made for an entomological cabinet. With very little actual expense to the College, this collection can each succeeding year be greatly enlarged.

The means of illustration in zoölogy should receive the special attention of this Board. The very important relation which zoölogy, in its several subdivisions, holds to the industrial pursuits, will certainly warrant the taking of special measures to make the means of illustration in this direction ample. It would certainly be to the interest of the College if a small fund could be placed at the disposal of this department, so as to secure whatever may be of interest in this direction. The out-door means of illustration — that is, the orchard, forest, vineyard, nursery, garden and ornamental grounds — can hardly be too highly estimated. Each successive year should add greatly to their value as illustrative apparatus, and will amply repay the small sum required to keep them not only in order, but in an improving condition. Besides this, they should all be made available for such practical experiments as the interests of the State require. It is not assuming probably too much to assert that the grounds now devoted to this department should be held as experimental grounds in the interests of forestry and fruit-culture. The tree planters of the East are looking to us for results; and it will be wise in all our plans for the future to remember that we are located almost in the middle of that great central region where forest-culture, upon as grand a scale as the world has ever known, must sometime be accepted as a necessity. In recognition of this fact, Prof. Sargent, of the Harvard Botanical Gardens, has forwarded to us about one hundred species of trees and shrubs. These have been planted out, and the results will be carefully noted. We should accept it as a fact, that experiments undertaken here in forestry and fruit-culture will interest a larger number of people, and facts deduced at this point will benefit a larger region of country, than probably at any other one point which is likely to be selected in the West for many years to come.

Hence the point aimed at from the first, in the planting of forest and fruit trees, has been to obtain by actual trial that knowledge which would be of practical value to the State, and in some degree to the whole prairie region of the West. The results so far reached have justified the time and expense involved, and are worthy the consideration of those who purpose either forest or ornamental planting in Kansas. With this object in view, during the past eight years plantations of the following varieties of forest and ornamental trees have been made:

Ailantus glandulosa.
Ash, White, (*Fraxinus Americana.*)
Ash, Blue, (*Fraxinus quadrangulata.*)
Ash, Green, (*Fraxinus viridis.*)
Basswood, or Linn, (*Tilia Americana.*)
Beech, (*Fagus ferruginea.*)
Birch, Yellow, (*Betula excelsa.*)
Butternut, (*Juglans cinerea.*)
Catalpa bignonioides.
Chestnut, (*castanea.*)
Cottonwood, (*Populus monilifera.*)
Deciduous Cypress, (*Taxodium distichum.*)
Elm, White, (*Ulmus Americana.*)
Elm, Red, (*Ulmus fulva.*)
Elm, English, (*Ulmus campestris.*)
English Walnut, (*Juglans regia.*)
Eucalyptus, in variety.
Hackberry, (*Celtis occidentalis.*)
Lombardy Poplar, (*Populus dilatata.*)
Maple, Soft or Silver, (*Acer dasycarpum.*)
Maple, Sugar, (*Acer saccharinum.*)
Negundo, or Box Elder, (*Acer Negundo.*)
Osage Orange, (*Maclura aurantiaca.*)
Oak.
Walnut, Black, (*Juglans nigra.*)
Shellbark Hickory, (*Carya alba.*)
Sweet Gum, (*Liquidamber styraciflua.*)
Willow, White, (*Salix alba.*)
Willow, Golden, (*Salix alba.*)
Willow, Weeping, in variety.
Willow, Kansas, perhaps va. (*S. fragilis.*)
Willow, Osier, (*S. viminalis?*)
And about 80 other varieties.

Of evergreens, or coniferæ, we have tested to some extent the following species:

Arbor vitæ.
Balsam Fir, (*Abies balsamea.*)
European Holly, (*Ilex aquifolium.*)
Juniper, Red Cedar, (*Juniperus Virginiana.*)
Juniper, Irish.
Juniper, Scotch.
Juniper, Trailing.
Hemlock Spruce, (*Abies Canadensis.*)
Larch, European, (*Larix Europea.*)
Pine, White, (*Pinus Strobus.*)
Pine, Pitch, (*Pinus rigida.*)
Pine, Scotch, (*Pinus sylvestris.*)
Pine, Austrian, (*Pinus Austriaca.*)
Pine, Table Mt., (*Pinus pungens.*)
Pine, Mountain, (dwarf.)
Pine, Piñon.
Spruce, White, (*Abies alba.*)
Spruce, Norway, (*Abies excelsa.*)

During the past eight years, several of the above-named varieties have been repeatedly planted, so that their value for culture in this State is quite well settled. On the list which should be discarded without further trial, we are forced to place the following:

Arbor Vitæ, all varieties.
Balsam Fir.
Beech.
Birch.
Eucalyptus.
European Larch.
English Walnut.
Most varieties of the Weeping Willow.

On the list for further trial, and to be planted only for experiment, with our present experience we should place the following:

Butternut.
Chestnut.
Juniper, Irish.
Juniper, Scotch.
Juniper, Trailing.
Piñon Pine.
Sugar Maple.
Sweet Gum.
Spruce, Norway.
Scotch Pine.
White Pine.

On the list of those which have been so far an unquestioned success, we place the following; though in some cases our experience has been too limited to encourage immediate extended culture:

Ailantus glandulosa, for high, dry localities alone.
Ash, White.
Ash, Green.
Basswood.
Catalpa.
Cottonwood.
Deciduous Cypress.
Elm, White.
Elm, Red.
Elm, English.
Maple, Soft or Silver.
Box Elder.
Osage Orange.
Oaks.
Black Walnut.
Willow, White or Gray.
Willow, Kansas, (*S. fragilis?*)
Willow, Osier, (*S. viminilis.*)
Red Cedar.
Spruce, White.
Pine, Table Mountain, (*P. pungens.*)
Pine, Austrian.
Pine, Pitch.
Pine, Dwarf Mountain.

It is just possible that the past eight years have given us a severer test upon the value of these several species of trees than we shall ever experience again, but the chances are quite as much in the other direction; hence it will be wise to prepare to meet like disasters in the future.

In selecting species of trees for our first planting, we should take those that are native to Kansas soil. The comparative value of these varieties, and their comparative immunity from insect enemies, demand a fuller discussion than the limits of this paper will permit, and I can simply endeavor to indicate the relative value of our leading native trees for forest-culture, all things considered, by placing them in the following list, with the most valuable first:

Black Walnut.
Ash, Green and White.
Red Cedar.
Willow, Kansas, (*S. fragilis?*)
Box Elder.
Honey Locust.
Coffee Bean.
Hackberry.
Cottonwood.
Soft or Silver Maple.

Experience teaches that in selecting from exotic trees for ornament or forest-culture, great caution is required. Many foreign trees are worthless here. A few, however, promise well, and hence their culture should be encouraged. At the head of this exotic list we place the Osage Orange. The tree is hardy, grows quite rapidly, and is really one of the most durable and valuable of timber trees, while it can be planted at less cost than almost any other species.

Our experience with the Ailantus glandulosa encourages us to believe that, while it has long been known to be worthless upon our rich bottom lands, for high, dry, and exposed uplands it will prove quite valuable. The wood is hard, fine-grained, and very unlike what the first appearance of the tree would indicate. If planted thickly, in three years it will shade the ground, and require no further care except occasional thinning.

The Catalpa also upon our highest and dryest soil makes a healthy growth, and at the same time can be grown upon our lower and richer lands. This tree has some attractions for ornamental purposes, but is more to be prized for its timber.

The Deciduous Cypress has so far proved entirely hardy, resisting the combined effect of locusts and drouth in 1874 upon both bottom and upland. The timber is durable, and exceedingly valuable for many purposes. This tree certainly demands more extended trials here and in different portions of the State. We call special attention to this tree, from the fact that experienced tree planters of the East have discouraged its trial, because it did not seem reasonable that a tree which grows so luxuriantly in the swamps of the South should succeed on the bluffs of Kansas — forgetting the fact that in the South this tree adapts itself both to the dry uplands and the swamps. Our eight years' experience leads us to anticipate sure and ample returns from the culture of the Deciduous Cypress on Kansas soil.

While disposed to encourage the planting of the trees above named when they can be obtained at reasonable rates, we believe that as a rule it is safe for the general planter to invest in exotic trees with great caution, for many which do well in other portions of the country will utterly fail when planted on average Kansas soil.

Another point has been clearly proved by the experience of the past eight years, and that is that for forest purposes trees should be planted closely, thus condemning most positively the provision of the "timber act" which permits the planting of forest trees "at a distance not exceeding twelve feet."

FLOWERING SHRUBS.

Three and four years ago a large number of flowering shrubs were selected and planted, with the view of testing their ability to endure our climate. I give the following list, with results stated in brief:

Tartarian Honeysuckle, hardy.
Clethra alnifolia, all dead.
Spirea, ten or twelve varieties, all hardy.
Tamarix, India, tender.
Cephalanthus occidentalis, native, hardy.
Forsythea Fortunii, tips winter-kill.
Forsythea Viridisimi, " "
Deutzia Fortunii, tips winter-kill.
Deutzia Scabra, " "

Deutzia Crinita, tips winter-kill.
Deutzia Crinita, pl. fl., tips winter-kill.
Calycanthus Floridus, tender.
Hypericum prolificum, hardy.
Philadelphus coronarius.
Berberis vulgaris.
Berberis, purple foliage.
Cydonia Japonica, (Japan Quince.)
Symphoricarpus vulgaris, native, (red.)
Symphoricarpus racemosus, tender, white.
Wiegelia Amabalis, four varieties, all winter-kill at the tips.
Althea, all tender.
Syringa vulgaris, (Lilac,) hardy.
Viburnum, (Snow Ball,) do not often succeed here.
Amelanchier Alpina, June Berry, Shad Berry, &c., hardy.
Amorpha fruticosa, (False Indigo,) hardy.

In the interest of ornamental culture, other species of shrubs should be collected and tested. And it is believed that no better service can be done in this direction than to collect the shrubs and small trees from our own forests which are worthy of culture, and so plant them upon our grounds as to call the attention of ornamental planters to them.

The purpose of this department to test varieties of fruit upon these grounds has been repeatedly referred to in former reports, and need not be dwelt upon here.

The ornamental grounds have received some attention since our last report. For reasons well known to the Board, it has been found out of the question to secure any completed plan of the entire grounds, and hence it has seemed necessary either to lay out drives, walks, and plant trees, upon a plan which would be subject to some material modifications in the future, or to leave all such work until all buildings and other matters were fully determined upon. The Board, wisely, as we think, have chosen the former course, and hence, by your direction, a large number of trees have been planted and portions of the ground seeded. In order to secure anything like a harmonious or desirable condition of the grounds, that portion embracing the public road, and south of the same, should be laid out and trees planted at the earliest possible time.

Respectfully submitted. E. GALE,
Superintendent Horticultural Department.

REPORT OF DEPARTMENT OF CHEMISTRY AND PHYSICS.

To the Board of Regents of the State Agricultural College:

GENTLEMEN: I have the honor to submit to you the following report of work and instruction in the Department of Chemistry and Physics for the period of one year and a half, since the presentation of my last report, in November, 1876. During this period the class-work of my laboratory has been as follows:

1. A course of lectures in Inorganic Chemistry, to a class of sixteen. On account of the difficulty of obtaining a suitable text-book for students in this course, I have made use of an Edison's electric press and pen, with which a full abstract of each lecture is daily issued to each student, with a great saving of time and labor. In addition to the numerous lecture-room experiments, this class has met regularly in the elementary laboratory for experiment and practice.

2. Two courses in Organic Chemistry, to classes of nineteen and twelve respectively, also fully accompanied by experiment and laboratory practice.

3. Two classes in Chemical Analysis, of nineteen and eight — this study not being now included in the ladies' course. The students of these classes have completed excellent terms' work in analysis of minerals, ores, mineral waters, commercial compounds, druggists' materials, ashes of plants, etc., each student occupying his own table, with his own set of apparatus, and working independently.

4. A class of four in Agricultural Chemistry, employing Prof. Johnson's "How Crops Feed" as a text-book. This class has also spent much time in the quantitative laboratory in the analysis of farm soils, both from Kansas and other States, and has been conducting some interesting experiments in water culture in the growth of corn, barley, oats, etc., in prepared solutions, for the purpose of observing the exact effect of different fertilizers in the growth of crops.

5. A class of four ladies in Household Chemistry, to whom has been given a course of lectures on the composition of food and chemistry of cooking.

6. Two classes in Elementary Physics, of sixty-nine and forty-nine each. These classes have completed in the physical laboratory a full experimental course in this study, embracing the laws of mechanics, light, sound, heat, magnetism and electricity. By the arrangement of this laboratory the apparatus is constantly before the student, and the experiments are largely performed by the hands of the students themselves.

7. A course in Mineralogy, with a class of seven. This course has also been conducted by lectures, with abstracts and crystal drawings from the electric press. Blow-pipe analysis of minerals has as usual formed a prom-

inent part of this study, each student determining and naming a large number of specimens from our mineralogical cabinet.

8. A class of seven in Agricultural Geology, considering the formation of the earth's crust, of the rock layers; the history and development of the geological ages; the geology of Kansas in full, and especially considering the nature, origin and formation of soils.

9. A class of five in Meteorology, who have completed a course of study of the laws of storms; of the manufacture and use of meteorological instruments; of the conduction of observations, constructing weather maps, storm and rain charts, and study of atmospheric electricity. The weather records which have been conducted for fifteen years past are still in progress, and reports are forwarded monthly to the chief signal officer of the army, and furnished to the press for publication.

In addition to the regular course of study in the department, my laboratory has been constantly open to special students who wish to devote themselves to some particular branch of study. Of these, during the period covered by my report, three have been received in Blow-pipe Analysis and two in Pharmaceutical Chemistry — one of whom has manufactured during the present term over fifty fine preparations, besides a large number of compounds for use in the laboratory.

The demands upon the department for special analytical work have been unusually numerous. The usual variety of silver, lead, zinc and iron ores, ochres, tripolis, lignites and coal, have been received from various parties and analyses returned. Minerals suspected to contain silver, from Woodson county, forwarded me through Governor Anthony for assay, together with a large assortment of specimens from many other parties in that locality, have been received for analysis on the supposition that they contained gold, silver, and copper. None of the specimens sent have furnished a trace of any of these metals.

During the last summer vacation some weeks were spent in an investigation for the U. S. Entomological Commission, who desired a full quantitative analysis of the blood and expressed liquids of the Rocky Mountain Locust, for the purpose of ascertaining whether it could furnish any product of practical and commercial value. The results of this examination have already been published in the *Industrialist*, and will appear in the official report of the Commission.

At the request of a large number of farmers, I have also undertaken an examination of the fungus corn smut, to determine its supposed poisonous qualities, and its connection, if any exists, with the extensive losses of stock through the State in the past two years. A preliminary analysis has already been made, but the full investigation will be completed during the coming vacation.

I have begun, and during the present summer vacation shall complete, a series of analyses of Kansas grains: First, of all varieties of Kansas corn, to determine their relative food and fattening value; second, of all our varieties of wheat, in which a beginning has already been made by the analysis of five varieties. As there is now in existence no definite knowledge upon this subject, but on the other hand a very wide difference of opinion among farmers of experience, it is believed that the results of this investigation will be of importance and of practical value.

Very respectfully, WM. K. KEDZIE,
Professor of Chemistry and Physics.

MANHATTAN, June 30, 1878.

REPORT OF DEPARTMENT OF HIGHER MATHEMATICS AND ENGLISH.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I have the honor to submit for your consideration the following report of the Department of Higher Mathematics and English for the three terms included between January 4, 1877, and May 22, 1878.

TABULAR VIEW OF CLASSES.

Terms.	*Males*	*Females*	*Total by classes*	*Total by terms*	*Whole No. taught*
SPRING TERM, 1877.					
Algebra, two classses	24	2	26		
Surveying	12		12		
Civil Engineering	3		3		
Political Economy					
U. S. Constitution	7		7	48	
FALL TERM, 1877.					
Algebra, two classes	16	14	30		
Geometry	10		10		
Rhetoric	21	18	39	79	
SPRING TERM, 1878.					
Trigonometry and Surveying	11		11		
English Structure, two classes	45	16	61		
Rhetoric	6	4	10		
English Literature	7	18	25	107	234

It would gratify me to give you the details of the work done by the several classes named in the preceding view, but it would occupy too much of your valuable time. For the methods of teaching pursued in this department, I refer you to my former reports.

The experience of each succeeding year confirms the wisdom of the plan adopted by this department at the first—elaborate treatises of the different subjects studied are adopted as text-books and selections made therefrom, according to the ability of the student and the time devoted to each study. By this method, under judicious instruction, every member of the class is furnished full work, and the more capable accomplish much more than they would were the text-book an abridgment. Thoroughness consists in doing well what is attempted, be it the whole of an abridged treatise or a portion of one more extensive.

It is said by some that our course in mathematics is too restricted, and that relatively mathematics does not occupy sufficient prominence in our present curriculum. The first objection applies with equal force to the whole curriculum, as it now stands. To the second objection, I will simply state that about one-fourth of the time of our present course is given to mathematical studies. This will appear if we admit book-keeping to be a part of arithmetic, and if we consider that at least one-half of the time given to drawing is devoted to practical geometry, which is really the basis of industrial drawing. The benefit of instruction in geometrical drawing was strikingly illustrated in the case of the class which completed our course in mathematics last term. This class, having been under Prof. Walters's instruction in geometrical drawing, did at least one-third more work in the time allotted to geometry, trigonometry, and surveying, than any previous class.

Again, it is often objected that we give only one term in algebra. We do not profess to go over the whole of algebra, but only what is needed for the subsequent part of the course. In demonstrating the theorems in geometry and trigonometry, we follow the analytical method, and thus the student is actually using algebra through all his subsequent course in mathematics.

As an evidence that proficiency in algebra is acquired here, I will mention the fact that students who have obtained their knowledge of mathematics in this College are now privately reading without difficulty Olney's General Geometry.

As the course of study is now arranged, algebra is the only branch of higher mathematics inserted in the woman's course. The young ladies are required to take algebra, but are not allowed to study geometry, etc. I respectfully recommend that algebra be made optional to young ladies, and also that young ladies who desire it may be allowed to take the higher mathematics in the farmers' course.

Before the course of study was cut down from six to four years, one term each was given to mechanics and to civil engineering. During the spring term of 1877 I had a class in the latter study. After completing Mahan's Treatise, the class were required to write papers on several subjects which had been discussed. One of these papers, on "Roads in Kansas," prepared by Wm. Ulrich, was published in the *Industrialist*, and copied quite extensively by the press of the State.

One year ago, English literature was made one of the studies in the woman's course. At the beginning of the last term, a class took up this study. It numbered twenty-five — eighteen young ladies of the second year, and seven young gentlemen, who obtained permission to take English literature as an extra study. The text-book used was Collier's. The College library furnished several valuable books for reference, among them Chambers's Cyclopedia. From the first, the class, without exception, manifested great interest in the study. As the microscope reveals to the student of natural history a world of wonders, unknown to him before, so during the last term, by the study of English literature, there was opened up to the minds of the young people comprising the class referred to a world of literature, of the existence of which they had hitherto been scarcely conscious. They were introduced to the great English and American writers who have bequeathed to the present the intellectual wealth of the past. To some of the class the names of many of these great writers were unknown. Very few had read much of what is termed the English classics. This need not surprise us, when we reflect that libraries are comparatively scarce in Kansas, and that the reading matter to which most of our young people have access is that furnished at the post offices and the news stands. I believe that the work done last term contributed very much to elevate the taste of those comprising the class, and also to decide their future reading. In all of my classes in English, exercises in composition are required of each pupil weekly.

Respectfully submitted. M. L. WARD,
Professor Higher Mathematics and English.
MANHATTAN, KAS., June 30, 1878.

REPORT OF DEPARTMENT OF ELEMENTARY ENGLISH AND MATHEMATICS.

To the Board of Regents of the State Agricultural College:

GENTLEMEN: Permit me to submit the following report of the Department of Elementary English and Mathematics, covering the time since January 1, 1877, including three college terms.

Eighty-six students have attended the class in drill in English. The course of instruction in this class has been shaped, not so much to prepare persons for teachers, or to pass an examination in technical grammar, as to qualify them to use the language with accuracy and facility, as it may be needed in common life. It is believed that it is of more practical advantage to a laboring man to have some thoughts upon a subject that may be presented to him, and to be able to express those thoughts, either by word of mouth or upon paper, with accuracy and ease, and according to the established usage of the day, than it is to be able to tell the full formula of parsing a certain infinitive verb in a sentence, agreeable to the plan of some of our modern grammarians.

The course has embraced a drill in penmanship, spelling, elementary sounds, reading, capitalization, construction and analysis of sentences, the elements which enter into their composition, punctuation, and the expression of original thoughts upon paper. The latter topic, with the criticism of the same, occupies from one-third to one-half the time of the whole course.

ARITHMETIC.

One hundred and seventeen students have received a drill in this study. So many of the young men of this State are allowed the privileges of this institution, who, from various causes, have had but limited opportunities for a common-school education, that it is found necessary to begin well toward the foundation. Considerable time has been occupied in securing accuracy, connected with some degree of speed and neatness, in the execution of the simple rules.

It has been the effort in giving this drill to place the student upon an independent train of thought in the solution of any question which he is liable to meet in ordinary business life. Many problems outside of the text-book have been proposed. Measuring-lines and rules have been given the students, and they have been required to compute the cost of flooring, carpeting, plastering, and papering certain rooms; to tell the cost of erecting the walls of buildings, of roofing them with shingles; to ascertain the number of cords in different piles of wood, of acres in a piece of land, of bushels the corn crib will contain, and of grain in the different bins on the College farm; and to compute the amount due on notes given by different members of the class, on which partial payments have been made; and a host of other examples of like import, endeavoring to bring the study as near to real business as possible.

BOOK-KEEPING.

One hundred and thirty-two students have received instruction in this branch of study. It has been the object to so acquaint them with the science that they shall practice it in whatever vocation in life they shall engage, and particularly to familiarize them with those forms of recording business transactions which are especially adapted to the farmer or mechanic. Instruction has also been given in the full form of double-entry, and, considering the time spent upon it, many students have made very creditable proficiency in the practice of it.

UNITED STATES HISTORY.

Seventy-nine students have attended this class. Previous to the last year, this study has been only in the woman's course, and it is to my mind a great improvement that it has been given a place in the general course, believing as I do that it has equal importance for gentlemen and ladies. The class at the first of the last term was so large that it seemed wise to divide it into two sections, and as my time was fully occupied in other classes, Prof. Shelton kindly consented to teach one division of the class.

VOCAL MUSIC.

Believing it to be the wish of the Board, I have continued to teach vocal music in two classes, giving each class two lessons a week. One hundred and thirty students voluntarily availed themselves of the privilege of entering these classes, and such a degree of improvement was made that they were able to supply the music on the occasion of the last two commencement exercises of the College.

J. E. PLATT,
Professor of Elementary English and Mathematics.

MANHATTAN, KAS., June 30, 1878.

REPORT OF THE DEPARTMENT OF INDUSTRIAL DRAWING.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: Allow me to submit the following report of the work and instruction of the Department of Industrial Drawing.

This report covers the time from the first day of February, 1877, when I took charge of the department, to the close of the spring term, 1878. I have taught five classes per day during that time, a short period at the beginning of the fall term excepted. The number of students enrolled for daily instruction in my classes has ranged between forty-four and ninety-six.

The system of Prof. Walter Smith, Art Director of Massachusetts, has been followed closely through the grades of free-hand drawing in the flat, geometrical construction, perspective and object drawing. An advanced class of ten male students has received a course of instruction in topographical drawing and the principles of mechanical and isometrical projection. Three students have in addition received instruction in the principles of shades, shadows and landscape drawing. Believing geometrical construction and mechanical projection to be the foundation of industrial drawing, the drill in these two branches has been as thorough as possible, without neglecting other fields.

The advancement made by the students has been very satisfactory, considering that, of all the students received at the institution, hardly five per cent. had ever been given any instruction in this study before. Many, too, when entering my classes, seemed to be prepossessed by a kind of prejudice against drawing, which could be counteracted only by much and careful labor on the part of the teacher. Permit me to say, however, that I have been successful even in this direction.

There is perhaps no study in the curriculums of our public schools and industrial colleges, which is to-day so much neglected as drawing, and no study which in the near future will take such a prominent position. In many European countries, from one-fifth to one-half of the school time is now devoted to drawing, and the manufacturing communities are watching each other with significant jealousy in regard to this highly-promising reform.

The education of the eye is certainly of infinite value, and the hand once master of the arts of design will handle more skillfully all other tools. He who masters drawing commands a dozen professions, and through all the changes of fortune, independence and self-reliance are never lost. A knowledge of drawing is always a livelihood. It is the key to every artistical and mechanical pursuit. A good draughtsman always commands employment, and stands upon the broad road of future progress. And who will estimate the moral influence of a systematic study of the beautiful?

The department is greatly in need of some additional models, for the purpose of illustrating the most frequent architectural terms. I respectfully request that an appropriation of $300 be secured for this department, if possible.

J. D. WALTERS,
Professor of Industrial Drawing.

MANHATTAN, KAS., June 30, 1878.

REPORT OF WOMAN'S INDUSTRIAL DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I submit to you the following report of work and instruction in the Sewing Department for the period of one year and a half.

Since my last report, in November, 1876, fifty-eight students have been taught in the different branches of ordinary family sewing, by hand and machine, and a number of dresses have been made by the students from their material for their own wear. There has been taught an elementary course of blackboard exercises, beginning with straight lines and curves used in designing patterns for those who wish to make themselves proficient as dressmakers. Ten have been thoroughly drilled in cutting and fitting by chart, and are thereby competent to earn a livelihood, if necessary. There are at present four sewing machines in the department, *i. e.*, Wheeler & Wilson, Wilcox & Gibbs, Secor, and the American.

HYGIENE.

The class in hygiene has been necessarily small. This is a study of which too little is made. From the standpoint gained by my limited experience, I am prepared to assert that health and long life are possible to many of those who die before they reach the years of maturity. The *central thought* kept before the class is, that they should be the living exponents of the knowledge gained by this study. The leading minds in our own country and Great Britain are keenly alive to the advantage derived from a study of the science of hygiene; also, the acquirement of knowledge requisite to the practice of sanitation. Women should be prepared, and feel the need, too, of teaching children more about themselves.

HOUSEHOLD ECONOMY.

Two classes have been taught in the kitchen laboratory, numbering nine and four. The subjects treated upon by lecture are as follows: "Household Management and Economy;" "The Management of Children, and their Primary Instruction;" "A Knowledge of the Laws of Health, and Nursing the Sick." Particular attention is given to the economical use of all foods, and the best method of preparation for the proper nutriment of the body. In as far as possible, this is *practical* work in the kitchen. The young ladies in these classes have manifested a zeal far beyond my expectations. Many of the ladies of Manhattan, and some of the prominent gentlemen, have taken an interest in the advancement of this study, and appreciate the difficulties of introducing it as a study—for which I heartily thank them. The day is not far distant when this "hobby"—as some are pleased to call it—and the study of hygiene will be prominent among the studies for women in our leading colleges.

Napoleon once asked, "What is needed to secure the prosperity of France?" The answer was promptly given by a woman, "Good mothers." If that was true of France, it is no less true of America. Let the education of women be such as relates to practical life and the promotion of health. Man is omniverous, and must be fed accordingly. Food is the most important of our wants; we cannot exist without it. The man who does not use his brain to select and prepare his food, is not above the brutes that take it in its raw state. It is to the physique what education is to the mind. Good and well-prepared food beautifies the physique, the same as good and well-directed education beautifies the mind.

> "We may live without poetry, music and art;
> We may live without conscience, and live without heart;
> We may live without friends, we may live without books—
> But civilized man cannot live without cooks.
> He may live without books—what is knowledge but grieving?
> He may live without hope—what is hope but deceiving?
> He may live without love—what is passion but pining?
> But where is the man that can live without dining?"
>
> —*Lucile.*

Respectfully submitted. MRS. M. E. CRIPPS.

MANHATTAN, KAS., June 30, 1878.

REPORT OF MECHANICAL DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I herewith give a brief statement of the operations of the Mechanical Department from December 1, 1876, to June 30, 1878, covering a term of nineteen months.

The course of instruction adopted in the shops has been to give the student actual practice in the handling, putting in order, and use of the tools used in the several industries or trades in which each was enrolled: in the wood shop, the sawing, planing, and framing of timbers in the various kinds of joinings in common use; at the lathe, the manner of metal and wood-turning; in the blacksmith shop, the welding and drawing of iron and steel, the tempering of steel, etc.; in painting, the mode of mixing paints and applying them—also, of varnishing, polishing, etc.

In the year 1876 there were—in the wood shops, carpentry, etc., 50 students; blacksmith shop, 5; turning, 5; scroll-sawing, 13; carvers, 2; painters, 3: total, 78.

In 1877 and 1878 there were—in the carpenter shop, 36 students; blacksmith shop, 2; turning, 6; scroll-sawing, 2; carvers, 2; painters, 3: total, 51.

Under the head of carpenters, those in wagon and cabinet-making are classed. The same principles underlie all the first operations in wood-work. As the apprentice progresses and becomes familiar with his tools, he is made familiar with the difference in the mode of making a wheelbarrow, a wagon-wheel, a table, a harrow, a window-frame, and so on, to the completion of each piece of work.

As a rule, the class for the last year has done better than ever before in acquiring skill, so that the system of employing one good mechanic to complete and make work salable after the student has done his best, has proved a success in that better facilities have been afforded in teaching by having the best work done under the student's eye for his imitation, and also enough has been sold to more than pay the wages of a first-class workman; I therefore most heartily recommend the continuance of this plan. You will see by the annexed statement of expenses and receipts that nearly four hundred dollars stand to the credit of the department.

I also present a statement of the general expense for the janitor work and amount of wood now on hand:

Janitor's wages per month	$35 00
Assistant janitor, part of the time	10 00
Total for 19 months	617 80
Cost for college year	387 86
Amount of wood on hand	44 cords

TREASURER'S RECEIPTS FOR CASH AND VOUCHERS.

From what source.	*Amount.*	*Amount.*
Vouchers		$2,229 09
Finished work on hand	$40 00	
Unfinished work on hand	35 00	
Material on hand	60 00	
Outstanding accounts	62 25	
Outstanding vouchers	48 65	
		245 90
Total		$2,474 99
Expenses		2,077 68
Balance		$397 31

All of which is respectfully submitted. AMBROSE TODD,
Superintendent Mechanical Department.

MANHATTAN, KAS., June 30, 1878.

REPORT OF PRINTING DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

I take pleasure in submitting the following brief report of the work of the Printing Department for the nineteen months ending June 30th, 1878.

The average number of students in my department during this time has been about thirty-five. A thorough course of instruction in the principles of the art of printing, together with daily practice and drill, has been given to these persons. Particular attention has been paid to spelling, punctuation, capitalization, writing essays, etc. The classes have given good satisfaction, having in nearly all cases made commendable progress. In two or three instances students have displayed a peculiar adaptation to the work of a printer. In the coming year I hope to make the course still more effective in accomplishing the task assigned this department.

As you are aware, the *Industrialist* has been continued regularly during this year and a half. Last October it was thought best to enlarge the paper, and accordingly a column was added to each page and the pages lengthened proportionately. The enlargement involved additional expense, both in making the change and in producing the paper thereafter. The *Industrialist* has certainly done some very effective advertising for the College, as the attendance at the coming term will show. Over 70,000 copies have been printed during the last year, making an average of nearly 6,000 a month, or 1,500 a week. The paper was offered as a prize to those pupils of the common schools in the State who upon due examination were found to excel in spelling, in figuring, in drawing, or in writing locals. A large number of teachers responded to the prize offer, and sent in the names of the successful competitors. While this increased our list materially, it afforded an opening for some of the most judicious advertising the College ever did. The paper has steadily grown in favor ever since it was established. Everybody, both inside and outside of the craft, has spoken commendably of it. No class of people are more competent to judge of its merits than editors, and from time to time they have very freely expressed their appreciation of it.

I submit with this report an account of the receipts and expenditures of the department for the year and a half past. The total expenses for the past year have been $825.72; the total receipts were $458.95—which deducted from the total expenditures show them to have been $366.77 greater than the receipts. At the President's request, I have furnished you with an estimate of the cost of publishing the paper during the next three months.

During the year the department has gotten out 1,500 copies of a 32-page catalogue, and printed a law brief, besides the customary job work for other departments.

This department needs some additional material, but can get along hereafter as heretofore, if the funds of the College do not justify an expenditure in this direction.

A. A. STEWART,
Superintendent of Printing Department.

MANHATTAN, KAS., June 30, 1878.

REPORT OF TELEGRAPH DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: I have the honor to submit for your consideration the following brief report of the Telegraph Department for the year 1877 and first term of 1878. During those three terms, sixty-four students were enrolled in this department, with an average class of about twenty-five each term.

Fourteen students who have received instruction in this department are now working with the Western Union Telegraph Company and with different railroads in the country. With the improvements and advancement that are now being made in the telegraphic art, we have not enough apparatus to fully instruct our students.

In conclusion, I would ask your consideration for a small appropriation for apparatus, so that students may be instructed in the measurements of resistance of circuits and batteries.

Respectfully,
W. C. STEWART,
Superintendent Telegraph Department.

MANHATTAN, KAS., June 30, 1878.

REPORT OF LIBRARIAN.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN: The library belonging to the Agricultural College consists of about 2,750 volumes, besides a collection of pamphlets, reviews and magazines, which, if bound, would number 250 or 300 volumes.

Last fall the most valuable portion of the library was removed from the old College building to the room now occupied by the Department of Higher Mathematics and English. This portion of the library may be classified thus:

	Volumes.
Agricultural and horticultural works	25
Agricultural reports	100
Historical, biographical and literary works	800
Scientific works	300
Making about	1,225

The remainder of the library, consisting of rather more than one-half of the volumes in number, but in bulk a much greater proportion, is securely kept in the old library room.

The portion of the library that has been removed is accessible to students and others at all school hours. Books are exchanged at the close of recitations. Since this arrangement was made, the library has been patronized by the students generally.

There have been added to the library since January 1st, 1877, chiefly through the courtesy of ex-Senator Harvey, the following works:

	Vols.
United States Senate Proceedings, 1876	1
United States House Journal, 1876	1
Report of United States Coast Survey, 1873	1
Report of Commissioners Vienna Exposition	4
Report of Commission on Education, 1874	1
Catalogue of Libraries in United States	1
Report of Secretary of the Interior, 1872, 1873, 1875	3
Messages and Documents, 1871–2	1
Compendium of Ninth Census	1
Statistics of Population	1
Report of Geological Survey of Territories	1
Report of Geological Survey of Wyoming	1
Report on the Black Hills	1
Report on the Flora of Colorado	1
Records of 44th Congress, 2d session	4
Wall Map of United States	1
Report upon Forestry	1
Report of Kansas State Board of Agriculture	1
Two bound volumes of the Industrialist (Pres't Anderson)	2
Whole number of volumes	28

The Patent Office Reports have been received through the year.

The Librarian will repeat the suggestion, that were he authorized by the Board of Regents he could secure, by exchange or solicited donations, many valuable acquisitions to the library, with very little expense.

The library needs replenishing in all of its departments.

Respectfully submitted. M. L. WARD, *Librarian.*

MANHATTAN, KAS., June 30, 1878.

SECOND BIENNIAL REPORT

OF THE

STATE AGRICULTURAL COLLEGE,

MANHATTAN, KANSAS.

1879 AND 1880.

TOPEKA, KANSAS:
GEO. W. MARTIN, KANSAS PUBLISHING HOUSE.
1880.

STATE AGRICULTURAL COLLEGE.

REGENTS' REPORT.

To his Excellency John P. St. John, *Governor of the State of Kansas:*

Dear Sir: The Regents of the Kansas State Agricultural College respectfully submit the following report, with accompanying documents, covering the two years ending June 30, 1880.

FACULTY.

Since the last report several changes have been made in the corps of instruction, by resignation of President J. A. Anderson, Professor H. E. Van Deman, and Superintendent W. C. Stewart. The filling of their places during the college year 1879–80 gives the following Faculty:

Geo. T. Fairchild, *President, and Professor of Political Economy.*
M. L. Ward, *Professor of Mathematics and English.*
E. M. Shelton, *Professor of Practical Agriculture, and Superintendent of Farm.*
G. H. Failyer, *Professor of Chemistry and Physics.*
E. A. Popenoe, *Professor of Botany and Horticulture.*
J. E. Platt, *Professor of Elementary English and Mathematics.*
J. D. Walters, *Teacher of Industrial Drawing.*
T. T. Hawkes, *Superintendent Mechanical Department.*
A. A. Stewart, *Superintendent Printing Department.*
I. D. Graham, *Superintendent Telegraph Department.*
Mrs. M. E. Cripps, *Superintendent Sewing Department.*
W. L. Hofer, *Teacher of Instrumental Music.*

The course of study still remains four years in length, and the standard of admission is still adapted to ordinary acquirements in common schools. The effort has been to make the course as compact and practical as possible, while giving a real education to the industrial classes. Each branch of study is given direction by the general tone of industrial training, while energetic study is made an essential of progress.

The industrial arts have been taught as heretofore, with slightly improved facilities, and steadily developing methods.

The studies pursued in connection with such training are shown in the following

GENERAL COURSE OF STUDY.

FIRST YEAR.

Fall Term.—Arithmetic, English Structure, Geometrical Drawing.
Winter Term.—Book-Keeping, English Analysis, United States History.
Spring Term.—Algebra, English Composition, Botany with Drawing.

SECOND YEAR.

Fall Term.—Algebra, Elementary Chemistry, Horticulture.

Winter Term.—Geometry with Drawing, Practical Agriculture or Household Economy, Organic Chemistry, and Mineralogy.

Spring Term.—Geometry, Entomology and Anatomy, Analytical Chemistry, or Household Chemistry, and Economy.

THIRD YEAR.

Fall Term.—Trigonometry and Surveying, Physiology, General History.

Winter Term.—Mechanics with Drawing, Agricultural Chemistry, Rhetoric.

Spring Term.—Civil Engineering, Chemical Physics, English Literature.

FOURTH YEAR.

Fall Term.—Agriculture or Special Hygiene, Meteorology, Psychology.

Winter Term.—Logic, Deductive and Inductive, Zoölogy, United States Constitution.

Spring Term.—Geology, Botany and Gardening, Political Economy.

The prosperity of the College is shown by the improvement of the place, the general satisfaction of the students, and the constant increase of numbers in attendance, as shown in the accompanying report of the President.

INCOME.

The annual income of the College, without any aid from the State, has, by strict economy, been made to cover the current expenses, and leave a small margin for reduction of the debt reported two years ago. The increasing attendance and enlarged demand for experiment and means of illustration, as well as the necessity of maintaining a well-equipped Faculty, make necessary some effort to increase the income from year to year. Current rates of interest upon investments are diminishing, and unless the endowment can all be made productive, the College will be crippled in its energies.

ENDOWMENT.

The act of Congress donating lands for the maintenance of such colleges, approved July 2, 1862, explicitly provides, among the conditions of donations:

"Sec. 3. That all the expense of management, superintendence and taxes from date of selection of said lands, previous to their sales, and all the expenses incurred in the management and disbursement of the money which may be received therefrom, shall be paid by the State to which they may belong, out of the treasury of said State," &c.

And further:

"Sec. 5. *First*, If any portion of the fund to be invested, as provided by the foregoing section, or any portion of the interest thereon, shall by any action or contingency be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund *remain forever undiminished* to the purposes mentioned in section 4 of this act.

"*Second:* No portion of said fund, *nor the interest thereon*, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings."

In a joint resolution approved February 3, 1863, the Legislature of Kansas accepted the endowment of lands made upon the above conditions, in the following terms:

"*Be it resolved by the Legislature of the State of Kansas,* That the provisions of the act of Congress entitled 'An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts,' approved July 2d, 1862, are hereby accepted by the State of Kansas; and the State hereby *agrees and obligates itself to comply with all the provisions of said act.*"

Yet, in 1877, the Legislature provided for the issue of Agricultural College bonds, to cover outstanding scrip authorized in 1870, to the amount of $11,000, and directed this Board to take these bonds as a part of the investment of the endowment, thus in fact diminishing both the endowment and the annual income of the College.

In the same year, the Legislature set apart from the endowment fund of the College $5,000, for the payment of taxes and expenses connected therewith, under the tax decision of the Supreme Court. For terms, see act approved March 5, 1877, entitled "An act to provide for the refunding of certain taxes assessed and paid on certain lands known as 'State Agricultural College lands:' "

"SEC. 4. The sum of five thousand dollars, or as much thereof as may be necessary, is hereby appropriated out of the endowment fund of the Agricultural College, to carry into effect the provisions of this act."

Upon the same principle, other taxes were previously paid by investment in the College funds, to the amount of $1,695.97. By these investments according to law, the annual income of the College has been diminished, of course, to the extent of seven per cent. at least of $17,695.97, or $1,238.71, each year. The total reduction in this way, during the four years past, must be $4,954.84. Other necessary expenses in management of the lands and endowment funds have been met from the current income of the College since 1877, to the amount of $5,540.90, because no provision has been made for them by the State. In absence of any appropriation for repairs of buildings, absolutely necessary repairs have been made from the College income, to the amount of $1,438.19. In these ways, the necessary annual expenses of the College have been increased, while the productive endowment, and consequently the annual income, has been diminished. We ask that all these deficiencies be made good by the State, since its honor is pledged to the General Government for the full equipment of the College and the strict preservation of its funds and annual income.

BUILDINGS.

To provide for the increased attendance of students, and for the constantly extending demands of the people of the State for industrial education, there will be needed during the next two years an enlargement of the College building and additions to the machinery of the institution. No room suitable for a chapel or assembly room now exists, and needed recitation rooms are devoted, for the present, to the library and reading room. We ask an appropriation of $30,000 to erect the central portion of the College building, after the plan so well inaugurated by the Legislature of 1877 in erecting the north wing. Plans are already in existence, and specifications will be at once completed, showing the whole in detail.

Immediate repairs for the preservation of the buildings are indispensable. They consist mainly in outside painting, and will cost $500.

Furniture to meet wear and additional numbers to be accommodated will cost $300.

Additional facilities for analysis are required in the chemical laboratory chiefly provision for a constant, even heat by gas flame, the complete apparatus for which will cost $500. The same department needs additional cases for the safe-keeping and proper display of its growing cabinets of minerals, at an expense of $200. A similar want in the Department of Zoölogy, Entomology and Horticulture must be met soon, at an expense of $250.

The Farm Department has, for some time, paid current expenses from sales of stock and produce, and has made some improvements. It still needs improvements in the way of fencing, ditching, and grading about the buildings, for which the sum of $500 is needed. It is also desirable that several of the less common breeds of cattle, now attracting special attention, be represented at the College, and any satisfactory beginning in this direction will take $1,000.

The farm is now in such condition as to make practicable a series of experiments in agriculture, such as the State at large is already demanding. These are impossible, without greater expense than the limited income of the College will warrant. An appropriation of $1,000 for the next two years would be an excellent investment for the College and the State.

The Industrial Departments are fairly equipped for present necessity, and their immediate necessities of growth can be met from the restored income of the College funds.

The College library, never well adapted to the wants of an industrial education, has remained essentially the same for years. It should have an immediate enlargement in works of direct interest to agriculture, horticulture, and the other arts of life, and should have provision for current growth with the constantly increasing knowledge in these directions. One thousand dollars a year is little enough for the maintenance of a library such as the College needs, and it is all that the Department of Instruction asks from the State.

The following is a summary of the immediate needs of the College, expressed in dollars and cents:

Endowment restored:		
College bonds	$11,000 00	
Tax refunding	5,000 00	
Tax-redemption certificates	1,695 97	
		$17,695 97
Income restored:		
Expenses of lands and loans	$5,540 90	
Expenses on buildings	1,438 19	
Interest diminished	4,954 84	
		11,933 93
Central building		30,000 00
General repairs and furniture		800 00

Chemical Department:		
Gas machine and fixtures	$500 00	
Cabinet cases	200 00	
		$700 00
Horticultural Department—cases for cabinets		250 00
Farm Department:		
Fencing, ditching, etc.	$500 00	
Special stock	1,000 00	
Experiments	1,000 00	
		2,500 00
Instruction Department: Library, each year	$1,000 00	
		2,000 00
Total		$65,879 90

The Board holds, for the College, bonds of certain school districts organized within the territory supposed to belong to Barton county, but since decided to constitute a portion of Stafford county. This complication and subsequent subdivision of districts have made some question as to the payment of these bonds. Every effort is being exerted to secure satisfactory settlement, but should these efforts fail, such legislation is desirable as shall make these bonds good and preserve the fund entire. The funds of the College are by law invested in school-district bonds, at 7 per cent. interest, with an immediate prospect of still lower interest. According to existing law, all contracts for the purchase of lands must draw interest at 10 per cent. Such legislation is needed as will allow the Board to make contracts at such rates of interest as are offered by corporations for sale of lands in the State. The taxation of lands under contract, before the issue of patents from the State, is a constant source of annoyance and expense, as well as of bad feeling on the part of the purchasers, and interferes with satisfactory settlement. The validity of such taxation is about to be tested in the Supreme Court. Should its decision sustain the present practice as legal, it seems desirable that the law should explicitly exempt such lands hereafter.

The claim of the State against the General Government for $7,686\frac{47}{100}$ acres of land, to complete the endowment of 90,000 acres, has, with the consent of the Board, been presented by Hon. S. J. Crawford before the Interior Department of the United States. A full report of the argument in the case has doubtless been presented to your Excellency. Should the claim be established through these efforts, the Board recommend that suitable compensation be provided for the services rendered by Hon. S. J. Crawford.

Further information, financial and general, is furnished in the appended reports of officers and Faculty. All of which is respectfully submitted.

STEPHEN M. WOOD, President,
W. L. CHALLISS, Vice President,
GEO. T. FAIRCHILD, Secretary,
E. B. PURCELL, Treasurer,
D. C. McKAY,
A. L. REDDEN,
A. J. HOISINGTON,
Board of Regents.

MANHATTAN, KANSAS, Oct. 14, 1880.

PRESIDENT'S REPORT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — In presenting a report which ought to include the eighteen months since the last executive report, I am embarrassed somewhat by the fact that but seven months of this period have been under my supervision. Having been, very unexpectedly to myself, elected by you in September last, I entered upon duty here December 1st, 1879, immediately after completing my fifteenth year in the Michigan State Agricultural College, from which you called me.

In taking hold of the work in this College, I have very naturally assumed that you expected my experience of the past to guide somewhat in solving the various questions arising here; and I gratefully acknowledge my obligation for the cordial confidence shown by you in all our intercourse.

Most of my efforts during the months past have been toward a minute acquaintance with all the departments of the institution. In this I have met the good-will of all the officers, and find myself better satisfied than I expected when first undertaking these duties.

In the general policy of the College I find no need of material change, believing that the success of all such institutions lies in their adaptation to the immediate and expressed wants of the people. I find the College fairly started in the way of meeting the call for direct union of mental training and manual skill. Any changes I may have suggested, or may yet have to suggest, are in the line of more complete work in both respects. After these months of acquaintance, I am, even more than at first, impressed with the wisdom of your action looking to greater thoroughness of discipline in both class work and industrials. I hope another year may make more evident the development of industrial energy for agriculture in all forms, which must ever be the leading interest for the College, as for the State.

My personal cares outside executive duties have so far included the teaching of a single class, and the oversight of commencement preparations. The fourth-year class of eight members completed satisfactorily Jevons' Elements of Logic, and passed examination June 7th. Two students were obliged to leave during the winter term, on account of ill-health. Seven graduates — two gentlemen and five ladies — prepared their final orations under my direction, having reported to me for rhetorical drill during several months.

Executive duties have been very confining, on account of numerous details as yet unfamiliar. I have sought to make no changes in the usual routine, before completely understanding existing methods; and full weight has been given to precedent in judgment of action and methods. Regular weekly Faculty meetings have been maintained, and all matters of general discipline or interest have been considered with marked interest and unanimity.

The students have been orderly, and generally well disposed. In a few cases parents have, by advice, withdrawn students who were failing in study or deportment. Several have been reprimanded, and one suspended, for willfully absenting themselves from classes. Six in one company have been expelled for the crime of stealing or abetting the act. All but one of this company were from the same neighborhood, and all were intimately associated here. Their names are marked in the catalogue just ready for issue.

The numbers in attendance have been greater during the past year, I believe, than ever before, while at the same time the average age is greater also. In 1878–9 the whole number of students was 207; 151 male, and 56 female. In 1879–80 the whole number was 276; 203 male, and 73 female. The average age, without fractions of years in individual ages, has been for a series of years as follows:

1875–6	17.70	1878–9	18.61
1876–7	18.12	1879–80	18.86
1877–8	18.16		

This increase of more than a year in the average age during the last five years, is partially explained by the wider range of territory from which students are drawn. The following table of counties and States represented shows the gradual increase:

REPRESENTATION OF COUNTIES AND STATES.

Counties.	*1878-9...*	*1879-80.*	*Counties.*	*1878-9...*	*1879-80.*	*Counties.*	*1878-9...*	*1879-80.*
Allen	1	1	Johnson	8	11	Shawnee	8	27
Anderson	......	4	Labette	1	......	Smith	1	......
Atchison	4	1	Lincoln	2	......	Sumner	2	1
Barton	......	2	Linn	......	1	Trego	....	1
Brown	......	1	Lyon	7	4	Washington	....	1
Butler	6	7	Marion	......	1	Wabaunsee	6	10
Chase	......	3	Marshall	2	4	Wilson	3	2
Chautauqua	4	1	McPherson	......	1			
Cherokee	18	13	Miami	......	1	STATES.		
Clay	3	9	Mitchell	2	2			
Crawford	2	1	Montgomery	3	2	Illinois	3	2
Coffey	3	......	Morris	......	3	Iowa	1	1
Cowley	3	5	Nemaha	6	5	Massachusetts	....	2
Davis	6	9	Neosho	2	......	Michigan	....	1
Dickinson	3	4	Norton	......	1	Missouri	1	5
Douglas	......	1	Osage	2	1	New Mexico	....	1
Ellsworth	1	......	Osborne	1	1	New York	2	1
Elk	......	1	Ottawa	3	5	Ohio	....	2
Ford	1	......	Phillips	......	1	Pennsylvania	1	......
Franklin	......	2	Pottawatomie	6	8	Vermont	1	......
Greenwood	1	7	Republic	1	......			
Harvey	1	......	Riley	65	77	TOTALS.		
Jackson	2	3	Rush	......	1	Number counties	40	48
Jefferson	4	6	Saline	2	4	Number States	6	8
Jewell	1	2	Sedgwick	1	2	Number students	207	276

During the last three years, a record of which is presented in the new catalogue, 458 different students have been in attendance, representing 61 counties of Kansas by 432 students, and eleven other States by 26 students. These are classified as follows: Fourth year, 28; third year, 45; second year, 138; first year, 245; in select studies, 2. Of these, 20 have taken the degree of B. S., making the whole list of graduates 56—gentlemen, 33; ladies, 23. A full list of the graduates, and also of the officers of the College from the beginning, in 1863, has been appended to the catalogue as a matter of interest and convenient reference. The catalogue is printed in the Printing Department, and does credit to Superintendent A. A. Stewart.

Much of my time has been taken up in study of such a system of record in the Secretary's office as may present concisely the financial condition of the College in all departments. A summary of results I present you in financial statements and forms. In this work I have enjoyed the assistance of Superintendent I. D. Graham. He has also aided me in filing and arranging vouchers, reports, letters, etc., accumulated in past years, so that all are within easy reach. The students' records of standing for the past two years have been completed, and all students in attendance since January last have their names entered in the new and permanent record, with a full posting of their past standing.

The general condition of the grounds and buildings has improved materially during the past two years. The completion of the north wing of the new building, provided by appropriation in 1877, adds to both appearance and comfort. The closing of the lane through the center of the farm, and removal of fences, sheds, etc., with adjustment of walks and drives about the buildings, have also improved the whole, setting more prominent the growth of trees and lawns. Improvements in the building now used as chapel, etc., are found satisfactory.

Of the several departments no general report is needed, since each is represented by a separate report. I believe all to be doing excellent work.

The prospect of increased numbers and more stable attendance seems such as to awaken inquiry for sufficient room in chapel, class-rooms and library. With present rates of increase, need of a chapel will be very evident before another two years are passed; and the library will soon be wanted, if we gather only such books as an agricultural college must have, to keep pace with the times. The Woman's Department needs better accommodations, with increasing numbers and increasing duties of the Superintendent.

Provision for increased expenses is also suggested by this enlargement. The endowment will need to be made as productive as possible, that our income may meet expenditures; since not only will general expenses increase, but the demand for fuller and more exact experiments will soon be felt. It is also to be hoped that the improvement of the farm and grounds may continue to keep pace with the general advancement of the State.

These suggestions grow so directly out of the facts of this report, that I may be pardoned for introducing them. They, with the report, are respectfully submitted for your consideration.

GEO. T. FAIRCHILD, *President.*

REPORT OF DEPARTMENT OF HIGHER MATHEMATICS AND ENGLISH, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I respectfully submit for your consideration an outline of the work done in the Department of Higher Mathematics and English, for the collegiate year ending June 30, 1879.

TABULAR VIEW OF CLASSES.

	Males.....	*Females...*	*Totals by classes..*	*Totals by terms....*
Fall Term, 1878.				
Geometry	7	1	8	
Rhetoric (two divisions)	62	23	85	
Political Economy	10	2	12	
	79	26	....	105
Spring Term, 1879.				
Surveying	7	....	7	
English Structure	42	6	48	
English Literature	22	15	37	
Logic	10	2	12	
	81	23	....	104
Total during year	....	....	....	209

My work in teaching has been four recitations daily during the whole year. In the discharge of my duties as a professor, I will simply say that I have done the best I could under the circumstances. The duties unexpectedly devolving upon me, as acting executive for the greater part of the year, often demanded the time that I should otherwise have used for the benefit of the individual pupils under my instruction.

The classes in rhetoric were composed principally of new students too far advanced to be placed in the English drill of the first year, and not prepared to take rhetoric proper. This difficulty occurs at the opening of every year. In my opinion an introductory year's course should be established, and the standard for admission to the first year be raised.

The classes were drilled in composition and criticism, after they had passed over the elementary principles of rhetoric.

Some attention was also paid to elocution, each member being required to declaim several times during the term.

The class in political economy went through Wayland's Treatise, re-cast by Dr. Chapin. During the term each member of the class wrote two essays or orations, which were read or recited in chapel before the Faculty and students. The themes of these papers were suggested by topics discussed in the class-room.

The class in English literature manifested an unusual interest in that study.

At the suggestion of their teacher, the class read contemporary English history, nearly every member providing himself with a copy of Green's History of the English People. Essays on historical and literary subjects were frequently required. These essays were read by their authors before the class, criticised, and discussed. In the preparation of these essays, a desire for reading and investigation was awakened to a degree far beyond the capacity of our present library to gratify. Whenever the minds of youth are thoroughly imbued with a desire for knowledge, books are in great demand. They become an imperative necessity in the work of education. It is at this period of life that the taste for reading is set, and the fashion of the intellectual life is shaped. I would again urge the importance of replenishing the College library.

The results that have followed the teaching of the two classes in English literature have been exceedingly satisfactory, and attest to the wisdom of inserting it in the course of study. During the first term of the year, algebra, which belongs to my department, was taught by Prof. Platt, in order that I might take charge of the class heretofore taught by President Anderson. The class in algebra passed over the usual course for one term. It would doubtless be for the interest of the student to give two terms, at least, to algebra.

The third and fourth-year classes have received instruction in elocution from different members of the Faculty. Rhetorical exercises have been held daily during the year, two members of the classes named above, appearing every morning in chapel with an oration, essay, or declamation. As a result of this drill and practice, the young people who took part in the late commencement exercises were enabled to acquit themselves with credit.

The great want of the Department of Higher English, is works on literature, and for reference in the College library.

Respectfully,
M. L. WARD.

Manhattan, Kansas, June 30, 1879.

REPORT OF DEPARTMENT OF HIGHER MATHEMATICS AND ENGLISH, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — I respectfully submit an outline of the work done by myself in the Agricultural College, since the date of my last annual report.

During the summer vacation, and until December 1, 1879, the duties connected with the Executive Department devolved upon me.

As Loan Commissioner, I have invested in the school bonds of sixty-eight school districts thirty-nine thousand three hundred and seven dollars and eighty-three cents ($39,307.83) of the endowment fund.

The general oversight of the College library has devolved upon me as Librarian.

During the entire year I have taught four classes daily, a tabular view of which I here present:

TABULAR VIEW OF CLASSES.

	Males......	Females...	Totals by classes..	Totals by terms ...
FALL TERM.				
Algebra (two classes)	37	12	49	
English Structure	32	8	40	
Political Economy	5	7	12	
	74	27	....	101
WINTER TERM.				
Trigonometry	14	....	14	
English Drill	26	10	36	
English Analysis	35	16	51	
English Literature	28	12	40	
	103	38	....	141
SPRING TERM.				
Algebra	32	5	37	
Surveying	11	....	11	
English Composition	17	15	32	
English Literature	22	9	31	
	82	29	....	111
Total during year	259	94	....	353

The methods of instruction followed in my department have been presented in former reports. Respectfully,
M. L. WARD.

MANHATTAN, KANSAS, June 30, 1880.

REPORT OF FARM DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Your attention is invited to the following brief outline of the work of the Farm Department.

This report includes, first, a statement of the instruction given by me during the past year, and, second, a review of operations on the College farm since November 30, 1878, the date of my last published report. Experience has shown the desirableness of having the reports of the Farm Superintendent submitted at the same time with those of the other departments of the College, instead of November 30th, as heretofore. On account of this change, this report, so far as it relates to the College farm, covers the eighteen months ending June 30, 1880.

During the year past I have taught classes as follows:

1. A class in physiology, numbering sixty-four students of the second year, from whom daily recitations were received during the fall term. The text-book employed is that by Dr. J. C. Dalton. The study of physiology is preceded by a three-weeks course of lectures on anatomy, in which such a knowledge of form and structure is given as will enable the student to study to advantage the functions of the body. The course in physiology we have found to be a valuable preparation to the study of stock breeding, which is taken by the same class during the winter term following.

2. A course of lectures on practical agriculture given to five members of the Senior class. This course embraces such complex subjects as Rotation of Crops, Agricultural Experiments, Stock Feeding, Manures, Farm Buildings. Much original work, in the way of planning farm buildings and arranging rotations, was done by the class.

3. A class in stock breeding and practical agriculture, numbering twenty-five students of the second year, to whom instruction has been given, partly through lectures and partly from Dr. Miles's Principles of Breeding. This class has made very thorough work with the subject of stock breeding, beginning with reproduction and ending with the form and characteristics of breeds. Under the head of practical agriculture, are included such subjects as Farm Implements, Simple Tillage, Application of Labor, Hoed Crops, and Stock Raising. The class has been required to make a critical examination of the College herds, thus familiarizing each student with the characteristics of the different breeds, and finally to mark according to a scale of points upon the individuals of each breed. This subject, stock breeding, is one of great interest to students, and it certainly is of overshadowing importance to the farmers of Kansas. It is therefore to be regretted that the College does not possess a few specimens of each of the prominent breeds of cattle and sheep. In particular, it would be greatly to our advantage for study to own pairs of each of the following breeds: Hereford, Angus and Ayrshire cattle, and Merino and Cotswold or Lincoln sheep.

4. A class in physical geography of ten students, mainly of the third and fourth years. The text-book in use is Guyot's well-known work.

5. A class of fourteen students of the third year, in rhetorical exercises. This class has received regular weekly drill during the spring term in composition and declamation, and in study of the principles of the rhetorical art. The progress made by the class was quite satisfactory. At the late commencement exercises four of the members of this class were selected to take parts in the exercises of the under-graduates' exhibition. It is gratifying to me to know that measures have been adopted, looking to more regular and thorough work in this important branch.

Such, briefly, is a general statement of the work of instruction done. But it should be remembered that a teacher's work can never be fully reported. Something of the range and scope of the work may be indicated, as I have attempted in this report, but the actual work done can only be shown in the every-day drill of the class-room and in the after-lives of the students.

In addition, I have had editorial charge of our College paper, the *Industrialist,* and have given to it whatever time has been at my disposal.

THE FARM.

In general, the circumstances of the season have been very favorable to agricultural operations. The dry weather which prevailed during the latter part of last winter and early spring materially injured a promising crop of winter wheat, and later, some sorts were damaged by chinch bugs — the facts to which must be attributed the low yield of wheat obtained the past season. But aside from this partial failure of the wheat, all crops have been grown and harvested under favorable circumstances, and the results have been satisfactory.

The general results of the season's cropping may be compactly shown by the tabular statement given below:

CROPS.	NO. OF ACRES.	YIELD PER ACRE.		COST.	
		Bushels.	*Tons.*	*Per bushel.*	*Per ton.*
Corn	22.50	47	....	$0 14	
Wheat, winter	17.00	13	....	54	
Oats	16.00	30	....	23	
Millet	11.00	....	2.09	....	$2 13

This table embraces only those crops grown in quantity such that accurate and fair accounts could be kept with each. A number of other products have been grown in small detached pieces, of which I am unable to report accurately. Among these are about eight tons of "tame hay," cut chiefly from lawns; a very large yield of pumpkins, grown upon about half an acre of land, and fed out during the season; about two-thirds of an acre of Golden millet, from which seventeen bushels of fine seed were obtained, and a small amount of clover seed, which has not yet been threshed.

It is my duty to call the attention of the Board to the fact that, while the demands upon the College farm are constantly increasing, its size and consequent ability to meet those demands diminishes from year to year. Thus the rapid increase in the numbers of our students, the necessity for performing more of experimental work, and the great increase in the College herds, are constantly creating fresh demands upon the farm. At the same time, the buildings and lawns already occupy nearly or quite ten acres, and this ought to be considerably increased during the coming year by the development of ornamental grounds. At the present time, the total area of arable and pasture land in use by this department, upon the lower farm, is less than 110 acres. I therefore earnestly ask the Board to take into account the advisability of increasing the area of the College farm.

FENCES AND BUILDINGS.

The work upon fences and buildings has been chiefly given to maintaining repairs. By the advice of the President and Faculty, I have permanently closed the west entrance to the College farm, by continuing the stone wall across the gateway. As the lane extending from the rear of the College buildings is now useless, except to foot passengers, I propose, with the consent of the Board, to return this lane to the fields which it crosses, by removing the south fence, and prolonging the cross-fences to the hedge on the north side of the lane. The stone wall surrounding the farm has received considerable repairs; some slight repairs have been made upon the barn; and the platform scales have been raised, to prevent the constant inundations to which they have hitherto been subject.

Stock.— Of work animals, the farm now owns five head, three mules and two horses. One of the horses has been added since my last report was made. Of cattle, the College owns two breeds, and of swine two, as follows: Short-horns 17, 15 females and one bull; Jerseys 5, four females and one bull; and of cross-bred cattle, one heifer. The Berkshire swine number eleven breeding animals, nine sows and two boars, and twelve "stock" hogs; of Essex swine, we have three young sows. During the summer, by the advice of the Board, I purchased in Illinois a young Short-horn bull to head our herd. In this, I consider myself to have been peculiarly fortunate, having secured a young bull of the "Constance" family, an animal of great promise individually, and of excellent breeding. We are under obligations to Messrs. A. M. Winslow's Sons, Kankakee, Illinois, the breeders of this animal, for a very liberal reduction in the price. In consequence of the sale of our old Essex boar, which had become useless to us, we are without male representation of this breed.

Our stock of all kinds has done remarkably well during the year. Disease has been hardly felt in the herds, and the general condition of the stock is very promising.

It is an interesting fact, and one that speaks well for our Kansas soils, that this 27 head of cattle and 5 horses, to say nothing of the swine, have been maintained from the produce of this farm of less than 130 acres, giving little more than four acres to each animal; and I am of the opinion, that during favorable seasons it will be possible, with our present system of cropping, to make three acres carry one head of cattle. This would be considered a valuable result under any ordinary system. I desire, in concluding this subject, to call the attention of the Board to the fact of the general awakening of our farmers to the importance of sheep husbandry, and to state my convictions that the College farm should not be behind in this matter, but that it ought to number in its "illustrative apparatus" representatives of at least two breeds of sheep — say Cotswolds and Merinos.

Experiments.— Our work in this direction has been confined to tests of different kinds of grains and grasses. Of winter wheat, five sorts — namely, Early May, Golden Straw, Silver Chaff, Arnold's Gold Medal, and Fultz — have been tried on a considerable scale. The yields per acre were as follows: Golden Straw, 7⅔ bushels; Silver Chaff, 8⅓; Arnold's Gold Medal, 6⅙; Early May, 13. The first three of these were grown in plats of one acre each; of the Fultz, one-half an acre was grown, and of the Early May a much larger amount. From an accident in threshing, I am unable to give more than an estimate of the yield of the Fultz. It promised a less yield than the Early May, and rather more than the other sorts. The quality of the Gold Medal, Golden Straw and Silver Chaff was very inferior. Indeed, it was so shrunken and worthless, that I became satisfied that it would be valueless for seed. From the fact that in the previous year these new sorts gave large yields of superior grain, we are admonished that the results of a single season are of little worth in determining a question of this sort. Of the considerable number of sorts tried by us during the past six years, none have proved equal to the red Early May.

Of corn, three sorts have been grown — Yellow Dent, Wright's Golden Yellow, and the small red sort called King Philip. The yield of each was as follows: Yellow Dent, 41.7 bushels; Wright's Golden Yellow, 63; King Philip, 53. Wright's Golden Yellow is a new sort, the seed of which we obtained from Mr. Wright, Mt. Pulaski, Illinois. In appearance it resembles the common yellow dent, but it ripens somewhat earlier, and we have no hesitation in pronouncing it a very promising sort.

Our experience with the tame grasses has been quite satisfactory, and fully confirms what I have said in previous reports, on this subject. For pasture, orchard grass has proved superior to all others tried, though perennial rye grass, alfalfa and clover have given good results. For mowing, alfalfa and red clover have given greatest satisfaction. The experiments have been given in detail, in the columns of the *Industrialist*, from time to time, and from thence have been extensively copied by the newspapers, East and West.

This department is indebted to Prof. W. J. Beal, Lansing, Michigan, and Prof. W. R. Lazenby, Ithaca, New York, for fine collections of seeds; to Mr. Wright, Mt. Pulaski, Illinois, for one peck of his Golden Yellow corn; and to Messrs. C. A. Crosby & Co., Kansas City, Missouri, for one of their very excellent spring-tooth harrows.

We have now in progress, experiments as follows: (1) With wheat, to test the comparative value of harrowing during the growth of the plant, harrowed strips alternating with an equal number which have received no special treatment; (2) in the growth of different sorts of grains, fodder plants and roots, including several varieties of common corn and rice corn, a number of sorts of common millet and pearl millet, seven kinds of spring wheat and barley and four of oats, five sorts of mangel wurzels, and two sorts of Southern cow peas; and (3) experiments in the feeding of pigs, to be completed during the coming fall. The results of these experiments will be laid before the Board in proper time.

FINANCIAL STATEMENT

Of operations on the College farm, for the eighteen months ending June 30, 1880.

DEBIT.		
To vouchers approved	$2,389 38	
To amount of produce on hand, December 1, 1878	827 80	
		$3,217 18
CREDIT.		
By amount of sales of stock and produce	$2,014 82	
By amount of produce on hand, June 30, 1880	442 05	
By amount of increase of live stock	775 00	
By amount paid for herd-books and office furniture	34 25	
By amount expended on College grounds	83 95	
By amount expended for experiments	66 25	
		3,416 32
Balance		$199 14

ABSTRACT OF INVENTORY.

Horses and mules	$450 00
Cattle: Short-horns	3,550 00
Jerseys	525 00
One cross-bred	25 00
Swine—Berkshire and Essex	730 00
Implements and harness	920 45
Grain—150 bushels corn	37 50
Crops on ground: Wheat, 18 acres	96 05
Corn, 30 acres	130 10
Oats, 5 acres	10 60
Millet, 20 acres	73 60
Grass land seeded	27 95
Experimental grains and grasses	66 25
Office furniture and herd-books	341 25
	$6,983 75

Respectfully submitted.

EDWARD M. SHELTON,
Prof. of Agriculture and Superintendent of Farm.

REPORT OF DEPARTMENT OF CHEMISTRY, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—I have the honor to submit for your consideration the following report of the Department of Chemistry and Physics, for the year ending June 30, 1879.

The following classes have been taught:

1. A class in inorganic chemistry, consisting of twenty-five members. Norton's Elements of Chemistry, issued April, 1878, was introduced as a text-book. It is a vast improvement on older works, in conciseness and topical arrangement. It abounds in experiments illustrative of principles taught. Our lecture room furnishes ample facilities for performing experiments in full view of the class. In addition, each student, so far as practicable, performs the experiments for himself, in the analytical laboratory. It is gratifying to note the marked improvement in manipulation, both in speed and neatness, acquired by this practice in the laboratory.

2. A course in organic chemistry, to a class of twenty-two. It is necessary, in this branch, to depend on lectures. By making use of Edison's electric pen, a full but concise abstract of each lecture was furnished the student, thus relieving him of the very onerous mechanical drudgery of copying lectures.

3. A class numbering fourteen in chemical analysis. The work in analysis may be outlined thus: Three series of substances were put up. The first series consisted of twenty bottles of simple salts in solution. The second series is a mixture of substances previously dissolved. The third series consists of solid substances. The pupil is entirely ignorant of the composition of the substance under examination, and works independently, receiving assistance only when unable to proceed in his work. When available, rock material, ores, minerals, mineral waters, etc., have been given the pupils for analysis.

4. A course of lectures on the composition of such food materials as had not been considered in organic chemistry and the chemistry of cooking, to a class of six young ladies.

5. A class of sixty-eight in physics. It was found necessary to form two sections of the class. By this means, a greater number of the pupils were enabled to perform the experimental and demonstrative work with their own hands.

6. A class of thirteen in geology. It was the aim, in the brief time allotted this subject, to give special attention to those topics which are of more practical value. Hence, the formation of rocks and soils, and the causes operating through geological time to produce these results, were fully considered. Also a brief view of historical geology was given the class.

7. A course in theoretical and determinative mineralogy, to a class of twelve. A portion of each recitation hour was devoted to work with blowpipe and reagents. The determination of minerals is very fascinating, and students enter upon the work with great zeal.

8. A course in agricultural chemistry, to a class numbering nine. In this course was discussed the chemistry of the soil and of plant growth, including the texture of soils and its relation to heat and moisture, as well as to the chemical reactions within the soil.

9. A class of nine in meteorology. In this course, attention was given to methods of taking observations, description and construction of instruments used, construction of weather maps, the laws of storms and the meteorology of our country. Tri-daily observations are made upon the face of the sky, direction of wind, temperature, height of barometer, hygrometric state of the atmosphere, and other casual phenomena. A record of these observations is preserved in the department, and a report forwarded monthly to the chief signal officer at Washington, and a report furnished Alfred Gray, of Topeka. Items of interest have been published in the *Industrialist.*

Besides the regular class-work, a number of specimens of minerals, ores, water, &c., have been received for analysis.

Upon methods of instruction, I have to say that it has been the aim, while not neglecting facts as a ground-work, to work upon the comprehension. Isolated facts are of little value unless the possessor of these facts can compare, and study relations. In the one case he cultivates the memory, the lowest of the intellectual faculties; in the other he develops the reason, the highest attribute of mind. To attain this latter result has been a leading feature of my work.

Respectfully submitted. G. H. FAILYER,
MANHATTAN, KANSAS, June 30, 1879. *Professor of Chemistry.*

REPORT OF CHEMICAL DEPARTMENT, 1879–80.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — I respectfully submit the following report of the work and instruction in my department, for the year ending June 30, 1880.

The plan of instruction is essentially the same as that pursued during the previous year, and is given more in detail in my report for last year. The principles taught in the class-room have been fully illustrated, and demonstrated by experiments, and it has been the constant aim to have the student repeat as much of the experimental work as possible. This acquaints students with apparatus and methods, and more fully impresses the truths taught. In inorganic chemistry, one recitation each week has been devoted exclusively to this experimental work. It is my wish to so arrange the class-work during the coming year, that on the day given to experimental work, the recitation may be two hours long. By this means the work may be much more thorough.

The class in chemical analysis was given two hours each day, instead of one, as heretofore. The results were so satisfactory that the same course will be pursued in the future.

Below appears, in tabular form, the list of classes taught, and the number of persons comprised in each:

	Males....	Females.	Total.....	
FALL TERM.				
Inorganic Chemistry (14 weeks)	23	10	33	
Geology (8 weeks)	4	5	9	
Mineralogy (6 weeks)	5	5	10	
				52
WINTER TERM.				
Physics	39	13	52	
Organic Chemistry	19	9	28	
Agricultural Chemistry	4	....	4	
				84
SPRING TERM.				
Physics	22	12	34	
Chemical Analysis	13	....	13	
Household Chemistry	....	5	5	
Meteorology	3	5	8	
				60

Good work was done by all these classes.

A large number of minerals have been received for identification. Many of them were supposed, by the senders, to be valuable ores. In all cases answers have been returned to the parties sending them. While this work makes but little showing, seemingly, it is of great importance to the people of the State. Quantitative examinations of brines and of a few other mineral substances have been made. But the department is deficient in apparatus for making agricultural analyses. I desire to engage in such work extensively during the coming year. To do so, I shall need platinum crucibles, dishes, &c., and additional glassware and chemicals. It will be impossible for me to do the work which will be demanded of the department without this addition to our stock of apparatus.

There is another matter to which I wish to call your attention. Alcohol lamps are very unsatisfactory for blow-pipe work. Our present course will increase this branch of chemical work. Furthermore, it is with extreme difficulty that some of the most important determinations in grain and soil analyses can be made with our present sources of heat—alcohol and charcoal. I desire, as soon as you can afford the means, to procure a pneumatic gas machine, for supplying us with vapor of gasoline. This gives a heat *almost* equal to gas, and will cost less. I hope this matter may receive your favorable consideration. We need a small store room in the basement, for storing chemicals in the winter. Some minor repairs are needed about the present museum and apparatus cases, and provision should soon be made for enlarging these cases, to meet the growing wants of this department.

Respectfully submitted. G. H. FAILYER,
Professor of Chemistry.

MANHATTAN, KANSAS, June 30, 1880.

REPORT OF THE HORTICULTURAL DEPARTMENT, 1878–9.

To the Regents of the Kansas State Agricultural College:

GENTLEMEN — The following is the report of the Department of Botany and Horticulture, for the College year beginning September 3, 1878, and ending May 21, 1879.

On the 3d of September, 1878, I took charge of the department. In accordance with the instructions of the Board of Regents, and especially those of President John A. Anderson, it has been my endeavor during my time of service to give to the students under my care such instructions as would be of benefit to them in practical life.

BOTANY.

In accordance with the course laid out in the curriculum, I taught the class in botany during the first three months of the term, beginning September 3, 1878. There were thirty-five in the class, which was formed into two divisions, for convenience in recitation. Owing to the fact that the season of the year afforded very poor opportunity for gathering specimens in a proper state for analysis, I could not make the instructions as experimental as I desired. However, everything that could be found to be used in illustrating the science was carefully sought. Occasional excursions were taken with the class, collecting and examining specimens. "Gray's Botany" was used as a text-book.

ENTOMOLOGY.

The last month of the first term was devoted to the study of entomology. There were thirty-three members in the class. Owing to the very short time allotted to this study, it was necessary to use a brief and condensed text-book. "Lessons in Entomology," by W. Wheeler, was selected as being the best for the time. It being winter, very few live specimens could be found, and the mounted specimens in the cabinet were used to illustrate, so far as they could be.

PRACTICAL HORTICULTURE.

At the beginning of the second term, January 3, 1879, the class in practical horticulture was organized. Twenty-nine members were enrolled during the term. Four months were devoted to this division of study. Instructions were given entirely by lectures and by practical work in the art, so far as was thought advisable. The lectures were intended to convey such information as might be needed in planting and caring for the orchard, vineyard, small-fruit garden, vegetable garden, and the rearing of nursery trees, &c. Forest culture and floriculture received a portion of our attention. Such principles and suggestions, relative to landscape gardening, as were thought to be susceptible of practical application, were also taught. In all these branches special attention was given to the selection of suitable soil and location, and such varieties as are suitable to Kansas. Each student was required to select and cut cions in the orchard, and to practice the various modes of grafting.

I was highly gratified with the deportment of the class through the entire year. Almost every one seemed anxious to learn not only the scientific, but the practical. If during the past nine months there have been planted the seeds that will bear good fruit in the lives of the members of the class, my object will have been attained.

OUTDOOR WORK.

From the day I took charge until the expiration of my time, it has been a constant source of thought and labor to put the appurtenances of the department in good order. Thickets of overgrown nursery stock, and other waste patches of brush and weeds, have been cleared up. The vineyard has been trellised, and put in good shape. The orchards have been plowed, and seeded to orchard grass. Owing to worthless seed, this last did not succeed. A number of new varieties of apples have been collected, and grafted into bearing trees in the orchard.

A choice collection of forest-tree seeds was received from S. M. Curl, M. D., of New Zealand, and another lot from Japan, through the Department of Agriculture at Washington, D. C. These seeds were carefully planted and cared for until my time of service closed. Some new varieties of fruits have been procured for the purpose of experiment. Among these is the Japanese persimmon (*Dyospyras kaki*), which is attracting so much attention. No money has been expended for these things, except in the case of apple stocks for grafting purposes, and in payment of postage in some other cases.

In connection with class instructions, I planned and executed an ordinary vegetable garden, that the students might better understand this much-needed and often-neglected matter.

ORNAMENTAL.—There being no definite plan of the grounds, but little could be done in this direction. Accompanied by some of my class, I went to the woods and procured some four hundred plants of the American ivy (*Ampelopsis virginiana*), and planted them at the base of all the College buildings except the barn. A little has been done in the way of making flower beds, and planting them with perpetual roses and other plants mostly of a permanent nature. A hedge of prim was set on two sides of the vegetable garden, which, if properly cared for, will become very pretty.

THE CABINET.

Specimens of wood have been received from Texas, and placed in the proper collection. Mr. Jno. Morrison, of Missouri, has kindly presented a very nice collection of the ferns of that section to be placed in the herbarium.

In addition to the duties of the department, I have taught a class of eleven in practical arithmetic during the last four months of the year, also a class of fifteen in zoölogy during the month of January, 1879.

Respectfully submitted. H. E. VAN DEMAN,
Professor of Horticulture.

REPORT OF THE HORTICULTURAL DEPARTMENT, 1879–80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I have the honor to present the following report on the work done in the Department of Botany and Horticulture during the period between September 10, 1879, and June 30, 1880.

BOTANY.

During the College year, I have had charge of two classes in this study. A class of third-year students, forty-three in number, was formed at the opening of the fall term. The time was unfavorable to the proper study of this science, on account of the lack of suitable material for illustration and study—a requisite, in my opinion, of greater importance than a text-book. Use was made, however, of all attainable material, with manifest advantage. The study was begun by the persistent examination of plants, without the use of books, or without direct instruction from any source, the object being to call the attention of the student to the importance and value of self-reliant observation. The time taken up in this manner was well spent. The course, as proposed by the text-book (Gray's Lessons), was slightly modified, to suit the requirements of our adopted course of study; less attention was paid to physiological botany, in anticipation of a more complete study of that branch in the after part of the course. The class was occupied in the study of botany for a period of ten weeks in the fall term, and three weeks in the spring term, the latter portion being given to the study of systematic botany, with the aid of Gray's Manual. Classified collections of plants were required of this class.

The first-year class in botany (a result of the recent changes in the course of study) was formed with the opening of the spring term, and included twenty-six students. Owing to the ease with which fresh material for study was obtained, the progress made by this class was very satisfactory. The mode of instruction and the scope of the course were essentially the same as described in my reference to the third-year class, with such slight modifications as were demanded by the less-advanced standing of the students.

HORTICULTURE.

At the opening of the winter term, a class of thirty-six third-year students was formed, for the study of horticulture. Instruction was given by lectures upon the important topics relating to the propagation and care of plants grown for use or ornament. It is my aim at all times to show the close connection existing between horticulture and botany, and in accordance, the first topics treated in my lectures were those general truths in physiological botany upon which depends all success in propagation or cultivation. I may instance, for example, the following: The seed and the bud, compared and contrasted; variation of the seed — how directed into profitable channels; cross-fertilization — its importance in the amelioration of varieties; the physiology of the various modes of bud-propagation So far as our facilities allowed, the practical operations in the nursery and orchard were taught in the only successful way — by actual practice. In this direction, however, there is room for greater results than have yet been attained; and it is desirable to increase the facilities for this branch of instruction in horticulture. I may here advert to the great interest shown by the student in these operations when performed by himself — a good illustration of one point of superiority in object-teaching.

ENTOMOLOGY.

As an adjunct to the course in horticulture, entomology was studied for six weeks. The first half of this time was devoted to the study of the anatomy and classification of insects in general; the remainder, to the consideration of the habits of our most prominent injurious and beneficial insects, with the best methods for the control of the former. The instruction was given entirely by lectures, illustrated by the insects themselves, by charts and drawings. Collections were required here, as in botany.

ZOÖLOGY.

This study was pursued under my instruction by a class of ten seniors and third-year students, using Orton's Comparative Zoölogy as a text-book. The work of the class occupied the winter and spring terms. That portion of the text-book given to systematic zoölogy being somewhat abridged, it was thought desirable to give opportunity for more extended acquaintance with the methods of study in this branch of the science. To this end, the class studied more in detail such specimens of birds as were at command, making large use of my private collections and library.

ADDITIONAL CLASSES.

In addition to the regular classes of my department, I was placed in charge, during the fall term, of a class of sixty-four second-year students in

Hart's "Composition and Rhetoric." On account of the size of the class, it was necessary to conduct it in two divisions. The work of this class included the preparation and presentation, once each week, of written exercises, embracing letters, essays, descriptive sketches, news-writing, and similar composition. This was in addition to the written work proposed by the text-book.

During the winter term I had charge also of a class of twenty-four students of the third year, in rhetorical exercises, one hour each week. The work of this class included essays, declamations, readings, and mutual criticism presented in writing.

The following summary shows the number and size of the several classes:

Botany, third year	43	students.
Botany, first year	26	"
Horticulture and Entomology, third year	36	"
Zoölogy, fourth year	10	"
Rhetoric, second year	64	"
Rhetorical Drill, third year	24	"
Total	203	students.

ADDITIONS TO THE MUSEUM.

During the period covered by my report, there have been added to the collections in my care the following:

TO THE ZOÖLOGICAL MUSEUM.

By purchase: 31 mounted specimens, including 28 mounted birds, 2 mammals, and 1 reptile.

By collection: A miscellaneous lot of alcoholic specimens, principally reptiles and crustaceans.

By donation: A skeleton, supposed to be that of a Cheyenne Indian — found in Ness county, and presented by Major Henry Inman, of Larned, Kansas.

TO THE BOTANICAL MUSEUM.

By collection: Several hundred specimens, consisting of herbarium preparations, woods, abnormal growths, seeds, etc.

By donation: 500 species of North-American flowering plants, presented by the writer; 2 finely-prepared sections of the wood of red cedar, by Mark Reeve.

TO THE ENTOMOLOGICAL MUSEUM.

By collection: About 1,500 specimens, chiefly pinned insects and alcoholic preparations of larvæ, including also many specimens of insect work on trees, in wood, and other materials.

By donation: About 1,000 specimens, principally pinned insects from my own collections.

It is my intention to enlarge the illustrative and experimental collection of varieties of fruits as fast as opportunity will admit. On account of the pressure of other work, I gave less time to the furtherance of this object the past spring than it will receive in the future. However, I made a few additions to the lists, received principally in exchange for surplus nursery stock, a few being acquired by purchase. The additions are: Raspberries, 12 varieties; blackberries, 4; strawberries, 14; grapes, 4; apples, 28; apricots, 2; nectarines, 1 variety. I also received in exchange a number of ornamental trees, shrubs and vines, which have been planted in appropriate places about the grounds, and in spite of the unfavorable season, are generally doing well. A few pines and spruces were purchased and planted. A number of trees from the rows bordering the walk to the Society Hall have been transplanted to places where they were needed.

Two large beds on the lawn were set with a variety of bedding plants; some being old and well-tried varieties, others new. The dry weather at the time of planting, and for some time after, and the work of insects, somewhat interfered with the success of these beds; the successful portion will furnish hints for future planting of this kind. The partial failure is in a large degree attributable also to the unfavorable state in which the plants necessarily were when received from a long distance. We greatly need facilities for the propagation of tender plants, both flowers and vegetables. Hot-beds are only available to a limited extent, and are too uncertain in results, requiring constant attention in severe spring weather.

The student labor employed about the grounds under my direction has been expended in part as intimated above, and also in attending to previous plantings. I found the need of a great deal of work in the orchard; it had apparently lacked proper attention for some time. During the winter we were employed in digging out dead trees, pruning, and clearing out generally. Later in the season, vacancies were filled by planting trees of varieties not represented in the collection, and a portion of the north block was seeded to orchard grass. The remainder of the orchards have been kept in constant cultivation with plow and hoe, up to date. During the coming season, I propose to seed a larger portion to grass, and will give the remainder different modes of treatment, manuring, cultivation, in different parts, with a view to a comparison of results. I planted as large a list of varieties as I could readily obtain of each of a few kinds of vegetables, to test and compare their values on our grounds, and also to serve as material for certain trials that I am making, but upon which a report cannot at present be made.

I have also located and begun the planting of an arboretum. This will be found on the slope east of the vineyard. For economy of space, and for convenience, the trees will be planted in nursery-rows, arranged, so far as consistent with their respective modes of growth, in accordance with natural relationships. This tree nursery will be the source from which can be obtained trees for removal to the lawns, as they are needed.

A definite part of the work about the lawns and buildings has been in my care, including all mowing with the scythe, trimming about the walks and roads, keeping the lawns free from weeds, and the care of the trees. This has called for the expenditure of more time and labor than would at first sight seem required, but I think it well repaid in the appearance of the grounds.

I have entered into a systematic re-cataloguing of the orchards and vineyard. This is all the more necessary on account of the total lack of such reference for the vineyard, and for a part of the orchard. Most of the trees have set sufficient fruit to enable me to identify those not listed, and to verify others. After all has been done that can, there will remain a few young trees that cannot be identified. I hope to have a satisfactory record ready for presentation in my next report.

As I was placed in charge of the department after the beginning of the fiscal year, I am unable to present a systematic financial report.

Respectfully submitted. E. A. POPENOE,
Professor of Horticulture.

REPORT OF DEPARTMENT OF ELEMENTARY ENGLISH AND MATHEMATICS, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — Permit me to submit the following report of the classes taught in my department of the College during the year closing June 30, 1879.

During the fall term of 1878, I taught classes in English, arithmetic and algebra. The class in English numbered forty-eight, and was taught without division. The class in arithmetic numbered fifty, and recited in two divisions. The class in algebra numbered seventy-three, and was also divided.

During the winter and spring of 1879, I taught classes in English structure, United States history, and advanced arithmetic with book-keeping. The class in structure was composed, chiefly, of students who had been in the English of the previous term, and numbered forty-six. The class in history numbered sixty-seven, and the class in book-keeping eighty-seven. Each of the two latter classes was divided into sections, occupying two different hours for recitation. In reference to the class in English, I may say that, after an experience of more than twenty years in trying to teach the science and art of using the English language, it is still a difficult problem to decide upon just the best line of work to pursue in teaching a given class for a limited time. During these twenty years, I have varied my method of teaching from spending nearly the whole time upon the science of the language, giving very little to the art, to the opposite extreme of occupying almost all of the time in the practice of using the language, and spending little upon the principles underlying the correct use of it. For practical purposes, aside from that of teaching, I believe the latter method is the better of the two extremes, for it is of more use to be able to write one's thoughts upon a subject with clearness and ease, and in conformity with good usage, in a penmanship that is legible, than it is to be able to parse all the words in a given sentence, without the ability to use language readily. But I am convinced that enough of the science should be taught to give the student the ability to know why his language is or is not in agreement with established usage.

Many of our students come to us, from fifteen to twenty-four years of age, without being good readers, good spellers, or good penmen, and knowing nothing of the principles of elementary sounds. They perhaps have a little knowledge of technical grammar, but have had almost no practice in the expression of their own thoughts. Our drill in English must cover all these points, together with the principles of, and practice in, capitalization, punctuation, and the analysis of sentences, which latter of itself is quite a field for study. Only four or five short months are allowed to accomplish all this; hence the problem of how best to employ the time. Nearly half the time was occupied in the effort to lead the students to express their own thoughts about pictures, objects and abstract themes, in a presentable shape; and I may say, in many cases, the work was attended with very gratifying success.

Our course in English structure embraces a knowledge of the origin of the language, its growth, its derivation from other languages, the formation of words from roots with their various prefixes and suffixes, using roots from the Saxon, Latin and Greek languages, and showing how our words are built from these various sources. It also includes drill in the structure of sentences. The object has been to introduce the pupil to many words in common use, with which he was not before familiar, to give him a clearer perception of the meaning of those words with which he was somewhat acquainted, and to give him variety, clearness and facility in expressing his thoughts. This work has been accompanied by regular practice in the expression of thought upon paper, and a criticism of the same. A portion of the time in these classes has also been spent upon declamation.

The best course to be pursued in the study of arithmetic is far more plainly marked than it is in the study of English. Every student needs skill in the use of the simple rules. He needs perfect familiarity in handling fractional numbers, both common and decimal, and as long as we have not the metric system, he needs acquaintance with our varying scales of denominate numbers. He must thoroughly understand the principles of percentage, as they apply to so many of the business transactions of common life; and he needs to develop his powers of thought in the application of all these principles. But those parts of the arithmetic which may be classed as ornamental, or which are put in simply for the purpose of showing what may be done with numbers, may wisely be omitted from the course in such an institution as this. The effort has been to make the study as strictly practical as possible, by applying the principles to tangible objects, which may be handled and measured by the class. Nearly as much work has been done outside the text-book as in it.

The class in algebra, last fall, was unusually large, from the fact that no advanced arithmetic class was organized that term, and those more advanced than the drill class were placed in algebra. The chief importance of this study, aside from familiarity with some of its formulas that are used in the higher mathematics, is the discipline it gives to the mental powers. For this purpose I consider it very valuable. The brief time devoted to the study of it in our course seems very unsatisfactory, if it is to be taught as a science; but with our present curriculum, I am not sure that a longer time can wisely be given.

The class in book-keeping last year was also quite large, as it embraced those who were in algebra the previous term, as well as the regular advanced arithmetic class, and some others who had not studied it before. This is a practical study, and considerable time was spent upon those forms of book-keeping which are best adapted to farmers, mechanics, or others who have comparatively few business transactions to record. Practice was also given in the full form of single entry, and two or three sets of examples in regular double entry. It is proposed the coming year to supplement the course in book-keeping in the advanced class by a course in commercial law, thus giving the students an acquaintance with legal forms and regulations in reference to common business transactions.

In reference to United States History, I have but little to add to the substance of my last report. The class is now open to both sexes, which was not formerly the case. This is as it should be, as the study is just as necessary for young men as it is for ladies. A portion of the class were obliged to stop near the middle of the term, to take drawing. The remainder continued through the term, finishing the study, and also spending three or four weeks upon the Constitution. This is quite desirable, and I think a full term should be given to such study.

In addition to the above classes, I taught last year, as heretofore, classes in vocal music, from 2 to 3 P. M. The number in both these classes was about fifty. By direction of the Board, I charged the last term a fee of $1.50 to each student. The pupils made commendable progress, so that we were able, by the assistance of Professors Hofer and Walters, as on some previous occasions, to furnish acceptable music for the commencement exercises — the reporter for the *Nationalist* remarking that it was the best music that had been supplied for the occasion.

In conclusion, allow me to say that we congratulate ourselves and the Board on now having neat, comfortable and commodious rooms in which to hold our recitations. We ought and intend to do better in the future than ever before, and look forward with bright anticipations to the grand future of the Kansas State Agricultural College.

Respectfully submitted. J. E. PLATT,
Professor of Elementary English and Mathematics.

MANHATTAN, KANSAS, October 13, 1879.

REPORT OF DEPARTMENT OF ELEMENTARY ENGLISH AND MATHEMATICS, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Permit me to submit the following report of the Department of Elementary English and Mathematics, for the year ending June 30, 1880.

The following branches have been taught in this department: English, arithmetic, book-keeping, and U. S. history. On account of the large number of students in these classes during the fall and winter term, I was unable to do all the work of the department; and I wish to acknowledge the assistance of Superintendent Graham in arithmetic, during the fall term, and that of Prof. Walters in arithmetic and Prof. Ward in English, during the winter term.

The work of the class in English has included a short course in penmanship, exercises in spelling, elementary sounds, reading, declamation, the construction and analysis of sentences (simple, complex and compound), the modifications and relations of the different parts of speech, the correction of false constructions of sentences, capitalization, punctuation, and written expression of original thought, including letter writing. Nearly one-third of the whole time in this class has been devoted to this latter exercise, with a criticism of the papers by the class and by myself. It is believed that the ability to express one's thoughts upon a subject within his grasp, easily, clearly and forcibly, in accordance with established usage, and in a legible handwriting, is of more value than any amount of knowledge of the science of language, without this ability. If we add to this the ability to utter these thoughts, either written or unwritten, in a manner to interest and move the feelings and opinions of an audience, it is certainly a great accomplishment. The field of elementary English is a broad one, and in the time allotted to it, some parts of it must be left with shallow cultivation; but I have the satisfaction of believing that in case of each member of the class, genuine progress has been made.

In teaching arithmetic, it has been my object to impart a knowledge of the science of manipulating numbers, as well as the art. Much time has been necessarily spent in endeavoring to secure skill in the use of the four fundamental rules of arithmetic. If all our students came to us with the ability to use these rules with accuracy and a reasonable degree of rapidity, nearly half of our work would be accomplished. If the mind and time of the student are occupied in the slow performance of the mechanical part of the work, with frequent errors which must be corrected, he is unable to attend to the scientific part of rules and principles. I fully believe, that if the entire first term of study in this branch were devoted to such a mental drill as was once given in Colburn's, or later in Robinson's mental work, it would be time well occupied. I have spent most time upon those principles which I considered most important for the industrial pursuits, and have endeavored to bring the class so in contact with real things, as to enable them to apply their knowledge to real transactions.

The classes in book-keeping have been made acquainted with the simple forms of single entry which are best adapted to the use of farmers or mechanics, or others who have but a limited number of business transactions to record; and it has been my object to impress upon the minds of the class the importance of keeping a record of these transactions in some systematic form. They have also been drilled in several sets of double-entry book-keeping. Each student has purchased a set of blank books. A list of articles, with their prices, has been taken from the business houses in Manhattan, also a list of real names from their ledgers: from these I have made a set of imaginary business transactions, which the students have recorded in their day books, journals, and ledgers. Many sets of books have thus been written, which, for accuracy and neatness, would make a respectable appearance in any mercantile establishment.

In teaching United States history, it has been my object to lay a foundation for future reading and study of history, to note the relation between causes and their effects, to cumber the mind with only a few periodic dates, but to have these so thoroughly learned as to be always remembered in connection with the prominent events in our country's history. I have endeavored to lead the pupils to notice the germs and the growth of our political institutions, and to make them acquainted with the present operations of our civil government, through the salient points in the Constitution.

The numbers reciting in the different classes during the year, by terms, not including those classes taught by the Professors who have assisted in my department, is as follows:

	No. enrolled in class.........	*No. exam'd at close of term.*
FALL TERM.		
English	58	47
Arithmetic "A"	54	37
Arithmetic "B"	36	31
WINTER TERM.		
English	40	29
Arithmetic	44	40
Book-keeping	62	43
History	54	37
SPRING TERM.		
English	56	45
Book-keeping	48	44
History	42	28

The whole number of different students reciting to me in each study during the entire year is as follows: English, 91; arithmetic, 106; book-keeping, 110; history, 96.

I have continued to teach vocal music, as heretofore, in two divisions, meeting each division twice a week. There were enrolled in these classes—fall term, 44; winter term, 61; spring term, 45.

Respectfully submitted. J. E. PLATT,
Professor of Elementary English and Mathematics.

MANHATTAN, KANSAS, June 30, 1880.

REPORT OF THE DRAWING DEPARTMENT, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Allow me to submit the following report of the work and instruction of the Department of Industrial Drawing, for the collegiate year of 1878–9.

Five classes have been taught per day, and the number of students enrolled for daily instruction has ranged between fifty-six and ninety-nine. The methods and text-books used have been those of last year. The system of Prof. Walter Smith, Art Director of Massachusetts, has been followed through the grades of free-hand drawing in the flat, geometrical construction, perspective and object-drawing. An advanced class of eight male students has, in addition to this, received a course of instruction in the elements of topographical drawing, tinting and mechanical projection. Of all students entering the institution, less than four per cent. had ever had any instruction in this study before. Considering this fact, I feel justified in saying that the advance made by the students has been very satisfactory.

The department is greatly in need of some additional models, new drawing tables, and a set of standard works on architecture and topographical drawing. I respectfully request that an appropriation of $75 be made for the purpose of procuring the above-named articles.

J. D. WALTERS,
Teacher of Industrial Drawing.

MANHATTAN, KANSAS, June 30, 1879.

REPORT OF THE DEPARTMENT OF INDUSTRIAL DRAWING, 1879–80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Allow me to submit the following annual report.

The number of students in my department has ranged between thirty-eight and eighty-eight. Four classes have been taught daily. The plan of instruction has been that followed for the past three years, based upon the admirable system of Prof. Walter Smith, Art Director of Massachusetts. A class of fifteen advanced male students have studied, in addition to Smith's course, the principles of projection. Six students have also solved a series of examples in shades and shadows, from Davies' popular text-book. A part of this advanced work was executed in India ink and water colors, and has been on exhibition in my class-room during the spring examinations, together with specimens of architectural drawing, executed by third and fourth-year students taking drawing as an extra study. I can say, without hesitation, that the advance made by the students of my classes in drawing has been as uniform as that in any other study—a fact disputed by many educators. As a whole, the department is in good working order. The arrangement of studies which has been decided upon for the coming year is very favorable for it, and I enter with great hopes upon the work of the coming winter. The appropriation of $75 which my department received last fall was expended in four new tables and a set of standard books of reference. The department is greatly in need of a large closet for storing away drawing-tools and models. Twenty dollars would probably meet this demand, and further expenditures are not at present imperatively necessary.

In addition to the work of the drawing department, the undersigned has had charge of the class in geometry during the fall term, a class in commercial arithmetic during the winter term, and the class in surveying during a part of the spring term. The class in geometry, consisting of twenty-two male students, completed Olney's Elements of Geometry, doing admirably well. The class in advanced arithmetic worked parallel with a class in charge of Prof. Platt, the regular teacher of this study. Forty students were enrolled in this class. The class in surveying drew a set of topographical plates and a large map of the College farm, under my supervision.

Respectfully submitted. J. D. WALTERS,

Manhattan, Kansas, June 30, 1880. *Instructor in Drawing.*

REPORT OF MECHANICAL DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I herewith submit the following report of the Mechanical Department of the College, for a period of twenty-one months from September 1st, 1878, to June 30th, 1880.

Whole number of students enrolled in the department for the year 1878–9 was 135; for the year 1879–80 the number was 165. Of this number, 15 in 1878–9 and 13 in 1879–80 were young ladies employed at scroll sawing. All others were enrolled as carpenters, whether they intended to learn the trade of carpenter, cabinet maker or wagon maker, as it is necessary to learn the use of the same tools in the commencement of either trade.

The course of instruction has been, to first teach each student the use of saws, planes, and all other tools needed in dressing out stock neatly; then to instruct them in the art of making mortises, tenons and such joints as they will need to make in the trade they choose to learn; and whenever the student can do these parts of the work well, he is given work in the line of the trade he desires to learn, especial pains being taken to train each student to keep his tools in order, and to do his work in such a manner that he may see just why each piece of work should be done in the way he has learned to do it. Each student, on finishing any piece of work, is shown how to paint, oil, shellac or varnish the same, so as to acquire some skill in the use of the brush. Since I have had charge of the department, students have been allowed to make articles for themselves, upon paying for materials used. Many of them have taken this course, and I am satisfied that where they have done so, they have been more prompt in their attendance, more careful not to waste material, and have striven harder to do their work well; and many of them have done very creditable pieces of work. The young ladies at scroll sawing have done some very good work for the very poor machine used; and should this be continued as an industrial, a great improvement would be made by adding two new machines, which could be purchased for from five to eight dollars. An additional turning-lathe is very much needed in so large a class, as with only one the students do not get a chance at turning as often as they would like. A very good lathe can be bought for about $50. About $25 will be needed to replace the tools that have become unfit for use by being worn out and broken; and also to purchase a few new ones.

The following statement of accounts from September 1, 1878, to June 30, 1880, shows the financial management of the shop:

Dr.		*Cr.*	
To lumber, doors, sash, etc	$799 60	By receipts	$1,212 18
To tools, hardware, etc	476 15	By increase of tools	156 53
To labor of students	308 76	By increase of stock	90 00
To labor of journeyman	13 00	By improvements in shop	30 50
		By instruction in blacksmithing	15 00
		By supplies in blacksmithing	5 25
		By balance, current expenses	88 05
Total	$1,597 51	Total	$1,597 51

Respectfully submitted.

TIMOTHY T. HAWKES.
Superintendent of Mechanical Department.

REPORT OF THE PRINTING DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—The following is a brief report of the work of the Printing Department, for the year ending June 30, 1880.

There have been about the usual number of students enrolled during the several terms, and nearly all have made commendable progress. The work of the department for the year past has differed but little from that of previous years. In February last, by your permission, the printing office was removed from Mechanics' Hall to the southwest room of the Chemical Laboratory. This change is a very acceptable one, enabling us to receive more students than formerly, and to arrange the office in a much more convenient way.

Since the College year closed, a few fonts of new type have been purchased, and the Mechanical Department has furnished us with a large pine case, neatly made, to receive proper stationery, books, etc., belonging to the office. These additional facilities prepare us to do more satisfactory work than heretofore.

In addition to the usual printing which the departments require, we have printed, in pamphlet form, 500 copies of the address delivered by Judge Thacher at the late commencement. We have also begun work on the College catalogue. It is expected to contain forty pages, and 3,000 copies are to be issued.

I herewith present, in tabular form, an exhibit of the receipts and expenditures of this department for the year past. From this statement you will find that the expenses of the department exceed its receipts by about $100. When we consider that the *Industrialist* is the greatest item of expense, and that it is not run for profit, but purely as an advertising medium, I think the showing made is a very respectable one.

RECEIPTS AND DISBURSEMENTS, 1879–80.

MONTHS.	RECEIPTS.					DISBURSEMENTS.			
	Students' fees...	*Advertising....*	*Subscriptions...*	*Sales of paper, envelopes, etc.*	*Credits from other departments........*	*Students' pay roll..........*	*Supplies—Paper, ink, type, etc., and express and freight on same..........*	*Postage........*	*Incidentals....*
July..................	....	$15 00	$0 80	....	....	$1 85	$70 40	....	....
August..............	....	80	7 45	....	$7 75	10 40	4 20	....	....
September	$30 00	....	7 85	$3 15	14 00	15 45	2 88	$6 50	....
October..............	23 50	4 50	6 55	40	7 80	14 70	11 50	2 20	....
November..........	25 50	....	3 15	2 95	5 70	15 40	....	1 80	....
December..........	12 50	6 25	6 35	2 00	3 70	18 90	44 90	2 52	$0 75
January............	19 25	....	4 90	75	1 25	16 85	74 82	1 90	....
February...........	25 00	....	1 65	50	12 85	14 70	6 90	1 88	2 10
March...............	18 00	2 50	1 25	....	3 00	17 80	5 60	1 95	50
April.................	15 00	....	4 80	2 10	1 50	13 95	2 80	24 26	....
May..................	14 00	50 40	2 00	....	12 55	18 00	....	2 70	....
June..................	3 00	5 00	75	....	10 50	24 05	36 17	1 76	55
Totals.............	$185 75	$84 45	$47 50	$11 85	$80 60	$182 05	$260 17	$47 45	$3 90

Total receipts, $410.15; total expenses, $493.57

Our facilities for instruction would be greatly increased by the purchase of one or more reference books; I would therefore respectfully ask you to provide my department with "Rounds's Printers' Cabinet," and "Ringwalt's Encyclopedia of Printing," price $4 and $10. These are valuable works, and would greatly assist in the teaching of this art.

Respectfully submitted. A. A. STEWART, *Superintendent.*

REPORT OF TELEGRAPH DEPARTMENT, 1879–80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Allow me to call your attention to the following brief report of the Telegraph Department, for the year ending June 30, 1880.

The total number of students enrolled in the department during the year was fifty-nine; of this number, eighteen were ladies and forty-one gentlemen. The average attendance per term was twenty-seven.

The running expenses of the department for the year were as follows:

Blue vitriol	$36 85
Zinc	8 47
Bills of other departments	7 00
Student labor	17 83
Total	$70 15

There were fifty pounds of zinc on hand at the beginning of the year, that do not enter into this statement.

Including additions of one mile of wire, new battery and a few new telegraph poles to the inventory, and the refitting of some old instruments, the total expenses of the department were $117.87; the total receipts were $123.50 — leaving a balance in favor of the department of $5 63 over all outlays.

As the course of training in this art is made to extend over two years, and properly so, the progress made by the students during the past year has been quite flattering. The class was taught, first, the telegraphic characters and their combinations; and after sufficient skill in transmitting and receiving had been acquired, they were drilled in the sending and receiving of messages, press reports, train orders, abbreviations, and all the practice necessary to make them familiar with and expert in the management of a telegraph line. And, as part of the drill, they were required to send messages to each other, using the tariff provided for the line; to keep a record of business transacted, and make reports to the Superintendent, as is required by telegraph companies.

In addition to this, the class received a course of instruction in the building and management of the line; the plant and maintenance of batteries; various forms and modifications of instruments, and how to use them. The strength, tension and measurement of the current, and the duplex and quadruplex systems of telegraphy were discussed and explained, as well as the means of illustration at hand would permit.

At the beginning of the year the department had but one advanced student, now there are six (three ladies and three gentlemen) working on the lines of the American Union, Western Union, and Atlantic & Pacific telegraph companies. As there is a demand for good operators, it is fair to suppose that, had more of the students taken time to become proficient, this number might have been larger.

The department yet needs a few things to enable it to accomplish its work more perfectly. I am glad to notice that an appropriation has been made by the Board for the purchase of new poles. As soon as satisfactory arrangements can be made, they will be put up, and the line placed in good condition. The accompanying estimate represents the present needs of the department.

I should be pleased to have the Board visit the department, and note its condition and wants.

Respectfully submitted. I. D. GRAHAM, *Superintendent.*

REPORT OF LIBRARIAN, 1878-9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—The library belonging to the Agricultural College has again been removed, since my last report. A portion of it is placed in the Secretary's office, and the remainder in the President's room. It is hoped that it will occupy its present quarters until a room can be separately prepared for it.

Arrangements have been made so that the library is open from 8 o'clock in the morning to 1 o'clock in the afternoon, five days of the week. The exchanges of the *Industrialist,* and a few other papers furnished by members of the Faculty, are kept on file in the library room.

There have been added to the library since June 30, 1878, chiefly through the courtesy of the Representative from the ~~Second~~ First Congressional District, the following works:

	VOLS.
Report of Chief of Engineers, 1877	2
Explorations in Nebraska and Dakota	1
Black Hills of Dakota	1
Explorations Across the Great Utah Basin	1
Geological Report, Santa Fé to Junction of Green and Grand Rivers	1
Journals of the Senate and House, for second session of Forty-fourth, and first session of Forty-fifth Congress	4
Report of Department of Agriculture, United States, 1876	1

Report of Department of Agriculture, United States, 1877	1
Report of Department of Agriculture, United States, 1878	1
Agricultural Report of Kentucky, 1878	1
Agricultural Report of Illinois, 1875 and 1876	2
Iowa Agricultural Report, 1876–1877	1
Kansas Agricultural Report, 1877–1878	1
Reports of the Smithsonian Institution, 1876, 1877	2
Illinois Industrial University Report, 1875–1876	1
Catalogue of Texas Agricultural and Mechanical College, 1878	1
Catalogue of Michigan Agricultural College, 1878	1
Eighth Report of Ohio State University, 1878	1
Illinois University Report, 1879	1
Finance Reports, 1876, 1878	2
American Newspaper Directory	1
Cyclopedia of Education (purchased)	1
Birds of the Colorado Valley	1
Explorations of the Colorado River, 1869–1872	1
Geological Survey of the Territories	1
Geological Survey, 1870	1
Geology of the Uintah Mountains	1
First Annual Report of Entomological Commission	1
Monograph on the Geometrical Moths	1
Monograph on American Rodentia	1
Bulletins of the United States National Museum, 7–12	5
Bulletins of the Survey of the Territories, 1-4	4
Lists of Elevations	1
Invertebrate Paleontology	1
Animal Resources of the United States	1
First Biennial Report of Superintendent of Public Instruction, Kansas	1
Biennial Report of State Historical Society	1
Iowa School Report, 1873–1875	1
Professional Papers, Nos. 13 and 15	2
General Index of the Agricultural Reports of the Patent Office, 1837–1861	1
Volumes III and IV of Industrialist (bound)	1
Whole number of volumes	60

With the exception of two volumes, the whole of the above list are donations.

The Librarian would again respectfully urge upon the Board the necessity of replenishing the library. He would call especial attention to the fact that the Encyclopedia Britannica, a library in itself, is now passing through its ninth edition, and can be procured on most favorable terms of the publishers of the American edition, Charles Scribner's Sons, New York.

An appropriation of $60 would procure the ten volumes already published, and the work could be secured by an annual outlay of $12 to $18 a year, until the work (twenty-one volumes) is secured.

Respectfully submitted. M. L. WARD, *Librarian.*

MANHATTAN, KANSAS, June 30, 1879.

REPORT OF LIBRARIAN, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I herewith submit my annual report of the library belonging to the Kansas State Agricultural College.

The following is a list of works added to the library of the College from July 1, 1879, to June 30, 1880:

	VOLS.
First Biennial Report of Superintendent of Public Instruction, Kansas	1
Biennial Report State Board Agriculture, vol. VI	1
Biennial Report State Historical Society	1
Smithsonian Report, 1876	1
Smithsonian Report, 1877	1
Illinois University Report, 1879	1
Volumes III and IV of *Industrialist*	2
Finance Report, 1878, U. S	1
Report of Chief Engineers, U. S. A	3
General Index Agricultural Reports, 1837-1861, U. S	1
Report Department Agriculture, U. S., 1878 (duplicate)	2
Iowa School Report	1
Senate Journal, 1877-78	1
House Journal, 1877-78	1
House Journal, 1878-79	1
Senate Journal, 1878-79	1
House Journal, 1879	1
Senate Journal, 1879	1
Messages and Documents—War Department, vol. I.	
War Department, part I, vol. II.	
War Department, part I, vol. II.	
War Department, part II, vol. II.	
War Department, vol. III.	
War Department, vol. IV	5
Department of State	1
Department of State (appendix)	1
Navy Department	1
Post Office Department	1
Reports of Michigan Board of Agriculture, 1873-4, 1875, 1876, 1877, 1878	5
Congressional Record Forty-Sixth Congress, part I and II (appendix)	3
Fleetwood's Life of Christ	1
Novum Organum (Bacon)	1
Encyclopedia Britannica, vols. I to X	10
International Monetary Conference	1
Agricultural Report of Missouri	1
Reports of Michigan Board of Health, 1873, 1874, 1875, 1876, 1877, 1878	6
Reports Michigan Board Agriculture, 1870, 1871, 1872	3
Reports Board Registration, Michigan, Nos. 5, 6, 7	3
Patent Office Report, Agriculture, 1853	1

Michigan School Reports, and Reports of Superintendent Public Instruction, Mich.,	19
Transactions of Michigan State Agricultural Society, 1849–59	11
Geological Survey of Michigan, 1869–1876, vols. I, II, III	3
Plates of Geological Survey, Michigan	1
Gleanings in Beulah. (Presented by the author, Josiah Copley.)	1
Report on Cotton Insects	1
Geological Survey, Colorado	1
Geology of the Henry Mountains	1
Lands of the Arid Region	1
Geological Survey of Territories	2
Bulletins of Department of the Interior, Nos. 1 to 21, excepting Nos. 6, 11, 16, 17, 18, 19, 20	14
Massachusetts Agricultural Transactions, 1851	1
Agriculture of Massachusetts, 1860, 1861, 1864, 1872–73, 1873–74, 1874–75, 1875–76, 1876–77, 1877–78, 1878–79, 1879–80	11
Agriculture of Maine, 1866, 1872, 1876–77	3
Report of Connecticut Board of Agriculture, 1876, 1878	2
Insects Injurious to Vegetation — Harris	1
Census of Massachusetts, vol. III—Agricultural Products and Property	1
Report of Massachusetts Convention, 1788	1
Reports of Massachusetts Board of Education	4
Fifth Annual Report of Massachusetts Board State Charities	1
Adjutant General's Report, Mass., 1865	1
Conservatory of Art and Science	1
Report on Location of Massachusetts Agricultural College	1
Report on Plan and Arrangement of Massachusetts Agricultural College	1
Report on History and Objects of Massachusetts Agricultural College	1
Fifth, Seventh, Eighth, Eleventh, Fourteenth and Seventeenth Reports of Trustees of Massachusetts Agricultural College	6
Report of Massachusetts Institute of Technology	1
Third Annual Catalogue, Institute of Technology	1
Seventh Annual Catalogue, Institute of Technology	1
Transactions of Massachusetts Agricultural Societies, 1847	1
Abstracts of Returns of Massachusetts Agricultural Societies, 1846	1
First Annual Report of Secretary Board of Agriculture of Massachusetts	1
Agricultural Schools in Europe	1
Agricultural Address by Hon. Josiah Quincy, 1817	1
First Agricultural Meeting — Address by Daniel Webster	1
Agricultural Addresses	3
Report of Canadian Dairyman's Association, 1868–1869	1
First Annual Report of American Butter and Cheese Exchange, 1874	1
Second Annual Report of American Butter and Cheese Exchange, 1875	1
Reports of American Dairymen's Association, 1868, 1869, 1870, 1871, 1872, 1873, 1874	7
Reports of Kansas State Horticultural Society for 1871, 1872, 1874, 1875, 1877, 1878, 1879	7

The semi-monthly reports from the Patent Office have been regularly received.

The whole number of additions for the year is 195, about two-thirds of which number are bound volumes. All these additions are donations, with the exception of the ten volumes of the Encyclopædia Britannica, which work the College is purchasing as the volumes are published.

The College is indebted to the Kansas Congressional delegation for valuable U. S. public documents; to G. C. Brackett, Secretary of the Kansas State Horticultural Society, for a nearly complete set of the Annual Reports of that Society; to the State officials of Michigan, for Michigan reports; and to Hon. C. L. Flint, Secretary of the Board of Agriculture for Massachusetts, for valuable reports from that State. The donations from Michigan and Massachusetts were procured through the personal efforts of President Fairchild, who is manifesting a great interest in the College library.

The exchanges of the *Industrialist* and several other papers, furnished by different members of the Faculty, have been kept on file in the library.

The library has been accessible to students at all hours of the school-day for the entire year, assistant librarians being in charge.

The books have been classified and arranged by subjects, so far as our present shelving would admit. About sixty volumes are now in the hands of the binder for repairs.

The Librarian would again urge upon the Board the necessity of making an effort to secure an appropriation from the Legislature for replenishing the library of the College.

Respectfully submitted. M. L. WARD, *Librarian.*

MANHATTAN, KANSAS, June 30, 1880.

REPORT OF THE HOUSEHOLD DEPARTMENT.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—I submit to you the following report of instruction in the Sewing Department.

Since my last report, in 1878, 125 students have been taught in the different branches of hand and machine sewing. With the exception of one term, I have taught five classes, often remaining in the afternoon. A good degree of proficiency has been attained. Cutting, fitting and designing are taught comprehensively in the department. Most of the work by machine has been executed in a superior manner, owing to the fact that two excellent machines were put into the department last fall by your kind permission, viz., the New Home and Royal St. John. In addition to these, there are in the department the American, Secor, Wheeler & Wilson, and Wilcox & Gibbs.

HYGIENE.

Two classes in hygiene have been taught, numbering four and seven, with pleasure to the teacher, and, I trust, with profit to the students, judging from the interest evinced by all in the classes, and that polite attention so dear to every teacher's heart, giving not only pleasure, but a true incentive to further and better effort, raising the office of teaching from the low ground of drudgery or duty to the position of giving and receiving. I hope, at no distant day, that educators may be brought to realize that the subjects relating to physical health shall be of the same educational importance as those relating to the intellect. The times demand that women should thoroughly understand the *laws of health*, and that their education should tend in that direction. A few lessons received from the mother in childhood might save many a community from diseases that are epidemic.

HOUSEHOLD ECONOMY.

Two classes have been taught in household economy, numbering nine and eight. The plan of teaching has been much the same as heretofore. Different subjects of importance to women as housekeepers, wives and mothers, have been taken up, and by my endeavors to educate by lectures, have given the class an opportunity to express their opinions and convictions on the subject in a concise form, as the different topics in the lecture were taken up and discussed. As much practical work has been done as was possible with the appliances and accommodations of the kitchen. This department can easily be made self-supporting. Respectfully,

MRS. M. E. CRIPPS,
Superintendent Sewing Department.

MANHATTAN, KANSAS, August 3, 1880.

TREASURER'S REPORT, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Herewith I hand you my report from July 1, 1878, to June 30, 1879, inclusive:

INTEREST ACCOUNT.

Balance due Treasurer, as per report, June 30, 1878	$8,177 29
Paid out on approved vouchers	18,411 62
	$26,588 91
Received from all sources since June 30, 1878	20,402 64
Balance due Treasurer	$6,186 27

LAND SALE ACCOUNT.

Balance in hands of Treasurer, as per report, June 30, 1878	$35,393 53
Received from all sources since June 30, 1878	30,932 70
	$66,326 23
Paid out on warrants of Loan Commissioner	38,971 53
Balance in hands of Treasurer	$27,354 70

APPROPRIATION ACCOUNTS.

Received from State Treasurer, on account of appropriation Practical Agricultural building,	$12,500 00
Paid out on approved vouchers	12,321 01
Balance in hands of Treasurer	$178 99

REFUNDING TAX APPROPRIATION.

Balance in hands of Treasurer, June 30, 1878	$1,600 52
Paid draft of State Treasurer	30 95
Balance in hands of Treasurer	$1,569 57

SECURITIES IN HANDS OF TREASURER.

School bonds	$139,414 40
Real estate securities	26,243 71
Refunding tax appropriation	5,000 00
	$170,658 11

All of which is respectfully submitted.

E. B. PURCELL,
Treasurer Kansas State Agricultural College.

MANHATTAN, KANSAS, June 30, 1879.

LAND AGENT'S REPORT, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—I herewith submit my annual report for the year ending June 30, 1879.

At the close of the last fiscal year there were yet unsold of land belonging to the College,	30,640 acres.
Sales canceled, and land returned to market since	640 "
Total	31,280 acres.
Sold during the year	5,120 "
Balance unsold June 30, 1879	26,160 acres.

The average price per acre received for the lands sold was $5.71—. The average last year was $5.88+.

The total receipts on account of land sold during the year just closed is $29,234.86. Of this sum, $5,226.87 was paid in cash, and $24,007.99 in notes.

At the close of last year's report, there were in my custody notes taken on account of sales of land to the value of		$71,627 41
Notes taken during the year		24,007 99
Making a total of		$95,635 40
Notes surrendered—sales canceled	$3,535 00	
Notes paid in full	6,332 72	
		9,867 72
Leaving of notes now in my custody		$85,767 68

These notes bear ten per cent. per annum.

The cash receipts in my department during the fiscal year just closed are as follows:

On account of sales of land	$5,226 87
On account of installments (former sales)	6,332 72
Interest on installments (notes)	5,433 19
On account of delinquent interest	141 43
Total	$17,134 21

For the above sums I hold the Treasurer's receipts, and I desire that the accounts be examined and passed upon by the Board of Regents.

There is a promising outlook in the Land Department for the coming year, and sales may be expected, while the interest payments are being promptly met.

Full statements of sales canceled, of receipts in detail, and of lands patented, are appended as a part of this report.

LIST OF LAND SALES CANCELED DURING YEAR.

Names.	*How canceled.*	*Description.*	*No. acres.*	*Value of notes canceled.*
J. O. Young	Surrender	N.W. ¼ 27—2—3	160	$840 00
Wm. Vandermark	Surrender	S.E. ¼ 23—14—1	160	980 00
Wm. Vandermark	Surrender	S.W. ¼ 23—14—1	160	875 00
C. W. Abbey*	Surrender	S.E. ¼ 25—14—2	160	840 00
Total				$3,535 00

*In case of C. W. Abbey, the notes were never actually signed by him; but, the sale being complete and regular in all other particulars, for convenience the notes are treated in this report as though perfected.

DESCRIPTION OF LANDS SOLD, PRICES, TERMS, AND DATES OF SALE, JULY, 1878, TO JUNE, 1879, INCLUSIVE.

Date.	*Purchaser.*	*Description.*	*No. acres*	*Price.*	*Cash received.*	*No. notes*	*Value of notes.*	*Total.*
1875. Oct. 6	Charles Bauer	N.W.¼ 9-14-4	160	$5 50	$110 00	7	$770 00	$880 00
1877. Sept. 15	M. J. Winkler	S.E.¼ 25-2-6	160	5 50	110 00	7	770 00	880 00
1878. Mar. 9	E. J. McMillan	S.W.¼ 23-3-7	160	5 50	110 00	7	770 00	880 00
June 5	Jacob Klateske	S.W.¼ 14-2-4	160	5 75	115 00	7	805 00	920 00
May 10	Stephen Wilson, Richard Walker,	N.E.¼ 6-2-4	160	5 00	100 00	7	700 00	800 00
June 25	C. W. Abbey	S.E.¼ 25-14-2	160	6 00	120 00	7	840 00	960 00
June 11	John Johnson	S.E.¼ 24-3-7	160	5 50	110 00	7	770 00	880 00
Aug. 1	George Gibbie	S.W.¼ 3-3-8	160	5 50	110 00	7	770 00	880 00
Aug. 1	Abner Hedge	S.E.¼ 10-3-8	160	5 50	110 00	7	770 00	880 00
Aug. 13	Israel Mundis	S.E.¼ 23-3-3	160	5 00	100 00	7	700 00	800 00
Sept. 2	Ad. Limkenheimer	S.W.¼ 20-1-5	160	5 50	110 00	7	770 00	880 00
Sept. 18	Julius Koehler	S.W.¼ 17-1-5	160	6 00	120 00	7	840 00	960 00
Oct. 14	Andrew Blumb	S.W.¼ 15-3-3	160	5 50	110 00	7	770 00	880 00
Oct. 14	George H. Blumb	S.E.¼ 15-3-3	160	5 50	110 00	7	770 00	880 00
Nov. 1	Edward Dexter	N.E.¼ 25-3-7	160	5 50	110 00	7	770 00	880 00
Nov. 9	Phillip Daniel	N.W.¼ 23-2-4	160	5 75	115 00	7	805 00	920 00
Nov. 9	Martin Schropp	N.E.¼ 23-2-4	160	5 75	115 00	7	805 00	920 00
1879. Feb. 1	Daniel Blocker	N.W.¼ 28-2-2	160	6 00	120 00	7	840 00	960 00
Feb. 10	R. J. Ross	S.W.¼ 10-3-8	160	5 50	110 00	7	770 00	880 00
Feb. 21	Samuel L. Means	S.E.¼ 14-3-7	160	5 50	110 00	7	770 00	880 00
Feb. 25	F. M. Darnetz	N.W.¼ 22-3-3	160	7 50	150 00	7	1,050 00	1,200 00
Mar. 3	W. F. Hackney	S.W.¼ 24-3-3	160	5 50	110 00	7	770 00	880 00
Mar. 14	James Kennedy	S.W.¼ 29-2-3	160	5 50	110 00	7	770 00	880 00
Mar. 28	John H. Priest	S.E.¼ 32-3-4	160	7 50	1,200 00	......	....	1,200 00
Mar. 24	Edward Fisher	N.E.¼ 24-3-7	160	5 50	400 00	7	479 99	879 99
Apr. 4	F. A. Holensteiner	S.W.¼ 25-14-2	160	6 00	120 00	7	840 00	960 00
Apr. 10	W. W. Bishop	S½ 23-14-1	320	5 79	321 87	7	1,623 00	1,854 87
Apr. 14	August Volkman	N.E.¼ 22-14-1	160	5 50	330 00	5	550 00	880 00
May 10	Rudolph L. Etler	N.W.¼ 27-2-3	160	6 00	120 00	7	840 00	960 00
May 10	Theodore Larabee	S.E ¼ 35-1-1	160	6 00	120 00	7	840 00	960 00
May 29	James C. Riley	N.½ of S.W.¼ 14-3-7.	80	5 50	55 00	7	385 00	440 00
May 29	J. M. Riley	S.½ of S.W.¼ 14-3-7.	80	5 50	55 00	7	385 00	440 00
	Totals		5,120		$5,226 87		$24,007 99	$29,234 86

RECEIPTS DURING THE FISCAL YEAR ENDING JUNE 30, 1879.

Month.	*Sales.*	*Principal on notes.*	*Interest on notes.*	*Delinquent interest.*	*Total.*
1878.					
July	$220 00	$680 05	$134 11	....	$1,034 16
August	110 00	430 00	113 13	$1 62	654 75
September	220 00	284 33	374 25	22 40	900 98
October	330 00	215 00	1,650 79	32 15	2,227 94
November	335 00	400 00	243 98	16 32	995 30
December	225 00	245 00	217 79	....	687 79
1879.					
January	215 00	145 84	53 40	....	414 24
February	350 00	431 66	257 16	5 06	1,043 88
March	480 00	965 84	614 97	12 03	2,072 84
April	2,050 00	600 00	644 65	20 75	3,315 40
May	471 87	1,340 00	542 96	25 75	2,380 58
June	220 00	595 00	586 00	5 35	1,406 35
Totals	$5,226 87	$6,332 72	$5,433 19	$141 43	$17,134 21

STATEMENT OF PATENTS ISSUED DURING THE FISCAL YEAR ENDING JUNE 30, 1879.

Name.	*Description.*	*Acres.*
Hannah Strachom	S. W. ¼ 35—14—1	160
W. E. Nims	S. E. ¼ 6—2—4	160
Spencer N. Hurlbut	N. W. ¼ 24—5—7	160
William Kandt	N. E. ¼ 15—15—4	160
John H. Priest	S. E. ¼ 32—3—4	160
J. B. Musser	N. E. ¼ 25—14—2	160
Richard E. White	N. W. ¼ 35—2—3	160
John H. Priest	S. E. ¼ 32—3—4	160
Total acres		1,280

Respectfully submitted. L. R. ELLIOTT,

Agent Kansas State Agricultural College Lands.

MANHATTAN, KANSAS, June 30, 1879.

LOAN COMMISSIONER'S REPORT, 1878–9.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Herewith find report of the investment of the endowment funds of the Kansas State Agricultural College, as shown by the records of this office, from July 1, 1878, to June 30, 1879.

Invested in school bonds	$37,437 00
Invested in bridge bonds	800 00
Invested in tax redemptions	734 53
Invested during the year	$38,971 53

All of which is respectfully submitted, with a request that a committee be appointed to examine the books and papers of this office, that my accounts be audited and approved. M. L. WARD,

Loan Commissioner Kansas State Agricultural College.

MANHATTAN, KANSAS, June 30, 1879.

TREASURER'S REPORT, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Herewith I hand you my report from July 1, 1879, to June 30, 1880, inclusive.

INTEREST ACCOUNT.

Balance due Treasurer, as per report of June 30, 1879	$6,186 27
Paid out on approved vouchers	18,732 36
	$24,918 63
Received from all sources since June 30, 1879	19,320 49
Balance due Treasurer	$5,598 14

LAND-SALE ACCOUNT.

Balance on hand, as per report June 30, 1879	$27,354 70
Received from all sources since June 30, 1879	41,522 62
	$68,877 32
Paid on warrants of Loan Commissioner	39,307 83
Balance in hands of Treasurer	$29,569 49

REFUNDING TAX APPROPRIATION.

Balance on hand, same as per report June 30, 1879	$1,569 57

SECURITIES IN HANDS OF TREASURER.

Refunding tax appropriation from endowment fund, according to act of Legislature, 1877	$5,000 00
Redemption certificates	1,695 97
Real estate securities and real estate taken under foreclosure	21,251 13
College bonds—investment according to act of Legislature, 1877	11,000 00
Noble township, Marshall county, bridge bonds, bearing interest at 10 per cent	800 00
School bonds bearing interest at rate of 10 per cent	110,414 42
School bonds bearing interest at rate of 7 per cent	41,131 75
	$191,293 27

All of which is respectfully submitted, with the request that a committee be appointed to audit my accounts to June 30, 1880.

E. B. PURCELL,
Treasurer Kansas State Agricultural College.

Manhattan, Kansas, June 30, 1880.

LAND AGENT'S REPORT, 1879-80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Herewith find full report of all the transactions in my department for the year ending June 30, 1880, and also a complete statement of the securities in my custody, and of the lands now unsold; also the number of acres patented and to whom, and the amount of matured interest now past due, together with the amount of principal and interest collected during each month of the year just closed.

The sales during the past year aggregate $3{,}195\frac{85}{100}$ acres, for a total sum of $21,040.88, of which $3,357.27 was paid in cash, and $17,683.61 remains at ten per cent. interest, secured by the land itself—the title remaining in the State. The average price per acre, it will be seen, is $6.66; the average last year was $5.71. There were, at close of last year, 26,160 acres unsold; added to this by cancellation and correction of list, $1{,}739\frac{79}{100}$ acres, and sold during the year $3{,}159\frac{85}{100}$ acres, leaving now unsold $24{,}739\frac{94}{100}$ acres.

In October, 1879, by direction of the Board of Regents, I reappraised all the lands then unsold, visiting personally almost every forty-acre tract, and readjusted the prices. The result was an advance in the average price, making a total advance of about *eleven thousand dollars,* the object being to make as much as possible of our endowment. The lands are all choice, and are purchased only for improvement, and usually by actual settlers.

During the past winter I carefully examined the circumstances connected with our original selection of lands, by which the $90,000 acres granted by Congress was reduced by the officers in charge of the General Land Office at Washington to $82{,}313\frac{53}{100}$ acres, and as shown by my report of February 10, 1880, it is quite probable that we may yet be indemnified for the $7{,}686\frac{47}{100}$ acres cut off by the double-minimum decision. The arguments presented by Hon. S. J. Crawford, agent for the State, in opening the case before the Commissioner of the General Land Office, in Washington, D. C., appear to be unanswerable. Copies of Mr. Crawford's brief and argument are in possession of the Board, and I need not allude to the subject more in detail.

I received from my predecessor a large amount of practically dead securities, and these have been carried along from year to year as though they were good, and the volume increased by cancellations, surrender of contracts, and forfeitures. During the last quarter of the fiscal year just closed, a thorough examination of all the securities was made by a committee of the Board of Regents, and the dead securities disposed of by proper action of the Board, so that those now in my custody are all supposed to be good, though some are considerably in arrears on interest. The entire value of the securities in my hands, June 30, 1880, was $75,026.29; represented by 500 notes and 10 contracts. On this sum there is now past-due interest to the amount of $5,508.59, a very considerable portion of which will be paid within the next fiscal year, as special efforts are being made to that end.

The question of taxes is becoming a difficult one, since purchasers in some cases persist in letting the tax remain unpaid till the land is sold by the county, although all contracts made since the close of 1876 provide that the purchaser shall pay whatever taxes may be assessed against the land so purchased; yet there is difficulty in determining just when and how to commence proceedings to enforce the terms of the contract. I do not know of any better way than to commit the whole subject to the care of the Attorney of the Board, for such action as the several circumstances may demand.

By the new form of contract, in use since March 1, 1880, notes are not given by the purchaser, and the securities are all in the form of contracts issued in duplicate. It is a simpler method, and I think will be found much better in practical use. In either case the land is security for the unpaid amounts—patents being issued only on full payment of principal and interest.

Hereto attached are full statements of all the business in my department, in detail, and I desire that an examination of my books and accounts be made, and full settlement be had to date. The following are the schedules attached, which are a part and parcel of this report:

SYNOPSIS OF REPORT AS TO SALES, RECEIPTS AND BALANCES, FOR YEAR ENDING JUNE 30, 1880.

LANDS.

Lands unsold, June 30, 1879	26,160.00 acres
Added to list by cancellation and correction	1,739.79 acres
Total on hand during year	27,899.79 acres
Sold during the year ending June 30, 1880	3,159.85 acres
Total unsold June 30, 1880	24,739.94 acres

SALES ACCOUNT.

Received in cash, account sales	$3,357 27
Received in notes, account sales	17,683 61
Total receipts	$21,040 88

SECURITIES ACCOUNT.

Notes on hand June 30, 1879, as reported	$85,767 68
Notes and securities taken during the year	17,683 61
Total during the year ending June 30, 1880	$103,451 29
Retired by cancellation and full payment	28,425 00
Securities on hand June 30, 1880	$75,026 29

Interest due June 30, 1880, $5,508.59.

CASH ACCOUNT.

Received on account of sales of land	$3,357 27
Account of installments on former sales	18,499 79
Interest on installments	5,994 39
On delinquent interest (compound)	258 26
Total cash received	$28,109 71

ABSTRACT OF SALES FOR YEAR ENDING JUNE 30, 1880.

Date.	*Purchaser.*	*Description.*	*No. acres.*	*Price.*	*Cash received.*	*No. notes.*	*Value of notes.*	*Total.*
1879.								
July 12	Robert McGregor.	S.W.¼ 14-2-2	160	$6 50	$260 00	6	$780 00	$1,040 00
July 21	N. H. Dodson	S.W.¼ 8-10-4	160	8 00	160 00	7	1,120 00	1,280 00
Aug. 16	Chas. Zeibell	N.½ of S.W.¼ 15-15-4	80	6 75	67 50	7	472 50	540 00
Aug. 16	Geo. Gabelman	S.½ of S.W.¼ 15-15-4	80	6 75	67 50	7	472 50	540 00
Aug. 21	John Mohr	N.E.¼ 23-2-2	160	5 50	110 00	7	770 00	880 00
June 30	Alfred S. Allen	N.E.¼ 7-2-2	160	6 50	130 00	7	910 00	1,040 00
Oct. 24	Jas. A. Gillett	S.W.¼ 26-14-4	160	5 50	110 00	7	770 00	880 00
Oct. 28	Thomas Haak	N.E.¼ 22-3-3	160	7 50	150 00	7	1,050 00	1,200 00
Nov. 15	Chas. H. Koepke	S.½ of N.W.¼ 22-15-4	80	7 50	75 00	7	525 00	600 00
Oct. 1	Edwin J. Nason	S.W.¼ 19-2-4	141.06	6 00	223 77	6	622 62	846 39
1880.								
Jan. 1	Johnston Haire	N.W.¼ 4-15-4	164.17	8 25	169 30	7	1,185 10	1,354 40
Jan. 28	Henry Stauffer	N.W.¼ 7-15-4	153.71	7 00	134 49	4	941 48	1,075 97
Feb. 27	Fredolin Sigrist	N.½ of N.W.¼ 32-10-4	80	6 50	65 00	7	455 00	520 00
Apr. 5	J. Albert Johnson.	N.W.¼ 15-3-3	160	6 25	125 00	7	875 00	1,000 00
Apr. 5	F. Wollschlager	N.W.¼ 25-2-7	160	7 00	140 00	7	980 00	1,120 00
Mar. 18	Edw Southwick	E.½ of N.E.¼ 18-10-4	80	8 00	80 00	7	560 00	640 00
Mar. 18	Wm. L. Streeter	W.½ of N.E.¼ 18-10-4	80	8 00	80 00	7	560 00	640 00
Mar. 25	Fred. W. Reamer	S.E.¼ 2-2-6	160	6 50	130 00	7	910 00	1,040 00
Apr. 15	Martin Schriber	S.W.¼ 2-2-6	160	6 00	120 00	7	840 00	960 00
May 12	S. Goodnough	N.E.¼ 18-2-3	160	6 50	130 00	7	910 00	1,040 00
May 26	F. Mohlman	N.W.¼ 20-1-5	160	6 00	120 00	7	840 00	960 00
May 25	A. Henry Hoeft	S.W.¼ 18-2-4	146.28	6 00	109 71	7	767 97	877 68
June 3	J. R. Brown	N.E.¼ 4-5-8	154.63	6 25	600 00	3	366 44	966 44
	Total		3,159.85		$3,357 27	152	$17,683 61	$21,040 88

Average price per acre, $6.66—.

RECEIPTS DURING THE FISCAL YEAR ENDING JUNE 30, 1880, BY MONTHS.

Month.	*Sales.*	*Installments of principal.*	*Interest.*	*Delinquent interest.*	*Total.*
1879.					
July	$130 00	$2,490 00	$391 78	$39 88	$3,051 66
August	295 00	1,015 00	390 00	42 80	1,742 80
September	110 00	2,218 55	660 88	20 28	3,009 71
October	130 00	2,188 96	633 84	10 05	2,962 85
November	335 00	508 58	490 40	4 70	1,338 68
December	223 77	655 00	268 83	....	1,147 60
1880.					
January	169 30	910 00	183 49	....	1,262 79
February	134 49	900 00	440 50	4 96	1,479 95
March *	65 00	2,917 89	827 74	3 75	3,814 38
April	675 00	2,841 70	789 83	59 79	4,366 32
May	130 00	2,694 00	632 83	11 74	3,468 57
June	829 71	283 00	716 10	60 31	1,889 12
Total	$3,227 27	$19,622 68	$6,426 22	258 26	$29,534 43

*Including supplemental report to balance accounts.

LIST OF LANDS PATENTED DURING THE FISCAL YEAR ENDING JUNE 30, 1880.

Name.	*Description.*	*No. of acres.*	*Date patented.*
John Ganby	N.E.¼ 22-3-3	160	March 31, 1880.
August Valkman	N.E.¼ 23-14-4	160	October 6, 1879.
W. F. Hackney	S.W.¼ 24-3-3	160	January 12, 1880.
John Ganby	N.W.¼ 22-3-3	160	March 13, 1880.
E. J. McMillan	N.W.¼ 23-3-7	160	May 18, 1880.
Milo Huston	S.E.¼ 15-14-2	160	December 3, 1879.
Thomas S. Brown	S.W.¼ 32-14-2	160	July 23, 1879.
E. J. McMillan	S.W.¼ 23-3-7	160	May 18, 1880.
J. B. Winkler	S.E.¼ 25-2-6	160	April 6, 1880.
Christian S. Kraybill	S.E.¼ 34-14-2	160	April 23, 1880.
Robert Knox	N.W.¼ 20-14-2	160	July 23, 1879.
Elihu B. Ditmars	S.E.¼ 24-3-3	160	December 3, 1879.
Herman Oesterreich	S.E.¼ 24-14-4	160	September 22, 1879.
J. P. Fengle	S.E.¼ 5-15-4	160	May 24, 1880.
E. N. Morrill	N.W.¼ 9-2-5	160	July 28, 1879.
Henry Meyer	S.W.¼ 33-2-6	160	August 7, 1879.
Henry Meyer	N.W.¼ 33-2-6	160	August 7, 1879.
John T. Maycroft	N.W.¼ 17-4-5	160	May 26, 1880.
Jas. T. Williams	N. E.¼ 33-15-4	160	May 28, 1880.
Total number of acres		3,040	

SUMMARY OF LAND.

ENDOWMENT.

Granted by General Government	90,000.00 acres
Less reduction for double minimum	7,686.47 acres
Total	82,313.53 acres

DISPOSITION OF ENDOWMENT.

Sold and patented to June 30, 1880	40,501.81 acres
Sold and now under contract	17,071.78 acres
Unsold, June 30, 1880	24,739.94 acres
Total	82,313.53 acres

LANDS IN WHICH THE COLLEGE IS INTERESTED, JUNE 30, 1880.

Unsold lands, June 30, 1880	24,739.94 acres
Lands under contract	17,071.78 acres
Total	41,811.72 acres

LOCATION OF LANDS.

In Riley county	6,466.75 acres
Clay county	240.00 acres
Marshall county	2,880.00 acres
Washington county	8,079.01 acres
Dickinson county	7,074.18 acres
Total	24,739.94 acres

Respectfully submitted. L. R. ELLIOTT,
Agent Kansas State Agricultural College Lands.

MANHATTAN, KANSAS, June 30, 1880.

REPORT OF LOAN COMMISSIONER, 1879–80.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen: Herewith find report of the investment of the endowment funds of the Kansas State Agricultural College, as shown by the records of this office, from July 1, 1879, to June 30, 1880.

Invested in school bonds	$38,976 75
Tax certificates, Strickler estate	331 08
Amount invested for the year	$39,307 83

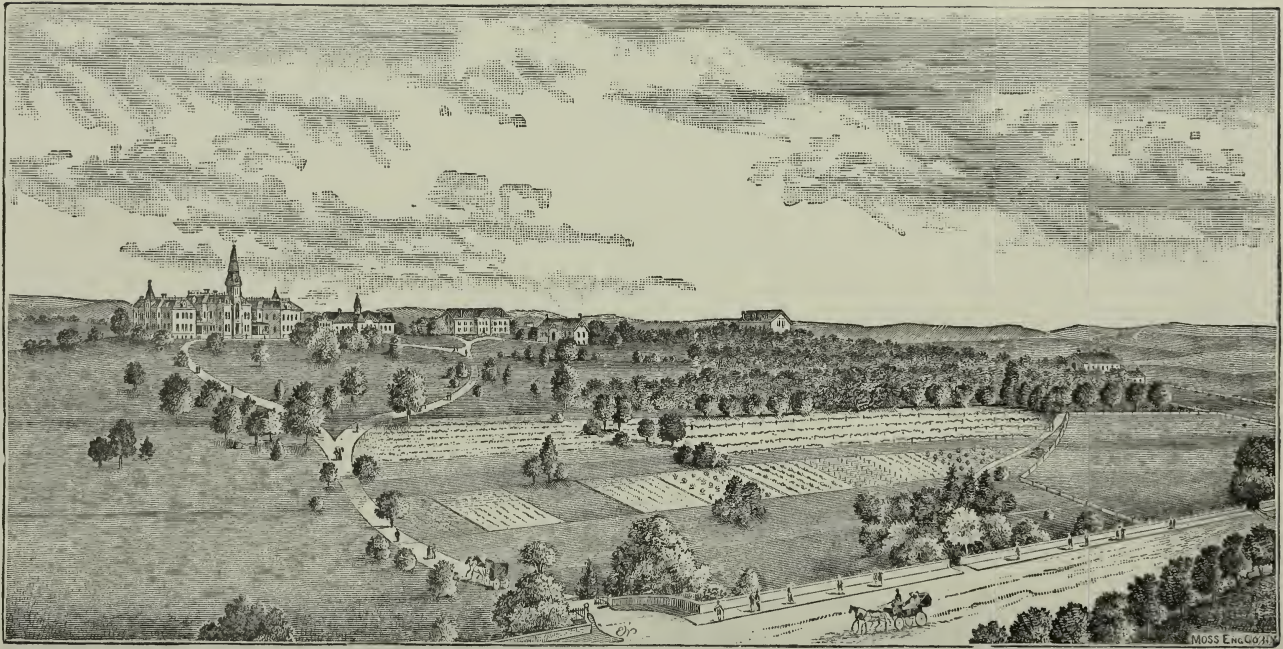
All of which is respectfully submitted, with a request that a committee be appointed to examine the books and papers of this office, that my accounts be audited and approved. Respectfully, M. L. WARD,

Loan Commissioner Kansas State Agricultural College.

Manhattan, Kansas, June 30, 1880.

SUMMARY OF INVENTORY, JUNE 30, 1880.

Old College buildings and grounds (present valuation)	$6,650 00
New College: Buildings (present valuation)	34,795 00
Farm, gardens and grounds	20,000 00
Executive Department, furniture, etc	2,084 42
Farm, barns, stock, etc	11,392 51
Horticultural Department, stock, tools, etc	886 45
Chemical Department, apparatus, etc	1,425 74
Mechanical Department, tools and stock	1,145 65
Printing Department, press, type, etc	1,135 14
Telegraph Department, line, instruments, etc	257 25
Higher English and Mathematics, apparatus	207 25
Elementary English and Mathematics, apparatus	52 50
Drawing Department, furniture, etc	133 30
Domestic Department, machines and furniture	463 55
Musical Department, instruments, etc	380 00
Library, books and pamphlets (estimated)	3,000 00
Cabinets (estimated)	2,000 00
Total	$86,008 7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STATE AGRICULTURAL COLLEGE, MANHATTAN, KANSAS.

STATE AGRICULTURAL COLLEGE.

THIRD BIENNIAL REPORT

OF THE

REGENTS AND FACULTY.

1881-2.

TOPEKA, KANSAS:
KANSAS PUBLISHING HOUSE.
1883.

STATE AGRICULTURAL COLLEGE.

REGENTS' REPORT.

To His Excellency John P. St. John, Governor of the State of Kansas:

DEAR SIR — The Regents of the Kansas State Agricultural College respectfully submit the following report, with accompanying documents, covering the two years ending June 30, 1882.

EQUIPMENT.

Thanks to the generous provision of the State, by act of Legislature in 1881, the Board have been able to put the financial condition of the College upon a very satisfactory footing, and to make the much-needed improvements in the buildings and apparatus presented in the last report. With the $17,979.09 granted for restoration of endowment and income funds, the College was made free from debt, so that close investment of its funds and careful collections have increased its annual cash income from a trifle over $18,000 to more than $28,000.

This increase has enabled the Board to make some needed improvements, while it has not been diverted from the legitimate purpose of the endowment — to maintain rather than build an institution of learning. The rapid growth of the College, coupled with diminishing rates of interest upon investments, has made it seem desirable to move carefully in expenditures, and a balance in the income fund has been allowed to accumulate, amounting now to more than ten thousand dollars, in readiness to meet the increased expenses of the constant growth.

The library fund of $1,000 for each of the years 1881 and 1882 has been carefully expended so far, nearly one thousand books having been purchased, and is meeting a very urgent want. It seems very desirable that similar amounts be appropriated for continued growth in 1883 and 1884. The library has been fitted with shelving to accommodate the necessary growth, and make its use convenient.

At the same time, an economical use of appropriations for buildings and other improvements has greatly aided in meeting the increased demands upon the College for instruction. The new building, erected and measurably furnished by the $30,000 appropriated, was occupied in part at the opening of the present College year, and comes none too soon to meet the pressing wants of increasing numbers. During the past year both chapel and recitation rooms have been crowded to such inconvenience and discomfort as to make the commodious new chapel highly appreciated as well as admired.

This central structure of the main College building has cost as follows:

Stone work	$9,758 70
Carpenter work	10,235 00
Plastering	2,100 00
Painting	641 75
Steam heating	4,775 00
Architect's fees, 3½ per cent	805 95
Seating	1,187 74
Other furniture	228 85
Sewerage and overflow	77 80
Cistern	150 00
Total	$29,960 79

Certain portions of the furniture and steam-heating apparatus are as yet unprovided for. The general advance in prices of materials and labor, and an underestimate of the cost of steam heating, account for this slight lack. The building, as it stands, is regarded as peculiarly neat and commodious, at a moderate cost.

The sums granted for general equipments and improvements have been used as proposed, and more has been added in the same direction from the increased income.

The endowment fund has been increased by sales of land from $295,889.05 to $361,206.35, and the actual amount at interest is nearly $150,000 greater than at the time of the last report. The average rate of interest is a fraction less than 8 per cent.

On account of the rapid sales of lands during the present year, it has seemed wise to raise their valuation, and the prices have been increased 20 per cent. The average price of the 12,590.37 acres still unsold is now $7.92 per acre.

The claim of the State against the General Government for a deficiency of 7,686.47 acres in the endowment lands has been faithfully prosecuted by Hon. S. J. Crawford, and is now before Congress in a bill which has already passed the Senate.

A complete system of accounts in the office of the Secretary, embodying monthly reports from the Treasurer, the Land Agent and the Loan Commissioner, as well as all bills against the College presented monthly, shows the condition of all funds at the close of every month. Quarterly reports are brought before the Board for comparison, and twice each year a complete inventory of securities and assets has been made by the Board, together with a strict auditing of accounts. Quarterly summaries have been made and published in the *Industrialist*, and full reports of all financial offices for each of the two years past are appended. Vouchers for all expenditures, in duplicate, are filed — one with the Treasurer, the other with the Secretary.

LITIGATION.

In previous reports, mention has been made of taxes levied in several counties upon lands held by the College as a part of its endowment, either under forfeiture of contract, or upon foreclosure of mortgage, and purchase to save loss.

It seemed wise to bring these matters to test in the courts, and accordingly collection of taxes has been contested in Saline, Dickinson and Jackson counties, to settle the principle in all its phases. One of these cases has been carried to the Supreme Court of the State; and all have been decided in favor of the College.

In the last report, attention was called to the bonds held against school districts now in Stafford county, but once supposed to be a part of Barton county. In three of the five cases a compromise was effected, at a loss to the College of $700 principal and $415 interest. In the other two, suit was brought in the district court, and judgment obtained in favor of the College. An appeal in one of the cases to the Supreme Court has settled the matter finally in our favor.

Suit in ejectment was brought in the district court in Riley county against the Board by former members of the Bluemont Central College Association, for the recovery of the property deeded to the State in 1863, on the location of the College at Manhattan. Counsel was employed to represent the Board in this suit, and also in a case in *quo warranto* in the Supreme Court, incidental to defense in the ejectment suit.

Minor matters have concerned collections upon contract for lands. The expenses in all this necessary litigation, covering a period of two and one-half years, have been met from the interest fund of the College — a fund which, according to law and contract of the State with the General Government, can be used only for the apparatus and instruction at the College. The amount thus used has been, for expenses, $496.01; for fees, $666.20; total, $1,162.21.

The claim of George Mutschler, presented to the Board upon authority of a special act of the Legislature in 1881, though contrary to the judgment of the Board, was approved and paid. The sum — principal, $504, and interest, $254.55 — diminishes by so much the funds of the College, and should be refunded.

FARM LANDS.

In the growth of the College, the amount of land devoted to farm crops and pasture has been reduced by the encroachment of buildings and grounds. It has for some years seemed desirable that addition be made from contiguous lands. The whole plot upon which the buildings stand is 155 acres, and nearly one-half of this is occupied by orchards, gardens, and lawns. A lot of 16 acres adjoining the College farm being offered for sale at $40 an acre, it was thought best to secure it, although no authority had been granted by Legislature for such a use of funds. It seems desirable that a sum not to exceed $4,000 be appropriated for the purchase of additional farm lands, to meet the provisions of the act of endowment.

GREEN-HOUSE.

The College needs at an early day a good green-house. It has had nothing hitherto suitable for carrying on any extensive investigations of plant growth, or for preserving its growing collection of interesting plants. A small room, 13x24 feet, heated by a brick flue, has been in use for two years past with gratifying promise of usefulness and profit, not only to the students, but also to the people of the State at large. A substantial green-house, heated by hot water, should cost at least $2,500. Even this would be far inferior to the facilities enjoyed by similar institutions in other States.

DWELLINGS.

There seems to be a necessity for the constant presence of several of the College officers especially in charge of its many and peculiar interests upon the premises. No provision has, up to this time, been made for their accommodation beyond the single farmhouse purchased with the place, in which the President stays, and a few rooms fitted up in one of the large buildings, occupied by the Professor of Agriculture. Suitable dwellings for the President and the Professors of Agriculture and Horticulture, who have immediate supervision of prominent interests, seem a pressing want; but immediate relief would be felt in the building of a single dwelling suited to the needs of the President's family, and fit to rank with the other College buildings. Such dwellings are found at most, if not all, of the State agricultural colleges of the country, and are considered a part of the necessary machinery. A dwelling suited to the surroundings, and fit to form one of the College buildings, (with barn, outbuildings, etc.,) should cost $7,500.

The main College building is as yet incomplete, by lacking one wing and a connecting corridor of the original design. With the present annual increase of students, the continuation of the plan will be an absolute necessity before another two years have passed. To erect and furnish this extension, and supply needed additions to the heating apparatus and furniture of the present structure, will take $20,000. The finished building, with all its furniture and steam-heating apparatus, will have cost the moderate sum of $62,500, and will be quite complete in all its parts.

FACULTY.

Several changes have occurred since the last report. Mr. A. A. Stewart, Superintendent of Printing, resigned October 1, 1881, and his place has been filled by appointment of Mr. Geo. F. Thompson. Mrs. M. E. Cripps, Superintendent of Sewing and Cooking, resigned September 1, 1882, and her place is taken by Mrs. N. S. Kedzie, B. S. Mr. T. T. Hawkes resigned September 1, 1882, and his place is filled by temporary apppointment of Mr. M. A. Reeve.

For the first time in many years, the College has complied with the act of

Congress providing for such institutions in teaching military tactics. Lieut. Albert Todd, of the First U.S. Artillery, a graduate of this College in 1872, was detailed as Professor of Military Science and Tactics, in August, 1881, his services being without compensation from the College.

With the beginning of the present College year, Mr. W. H. Cowles, A. B., takes the position of Instructor in English and History, made necessary by the increased number of students. Further additions to the Faculty will be needed with each increase of fifty in the number attending the College.

The Faculty as now organized is as follows, the salaries paid each being annexed:

George T. Fairchild, A. M., President, Professor of Logic and Political Economy	$2,200
Milan L. Ward, A. M., Professor of Mathematics and Engineering, Loan Commissioner	1,600
Edward M. Shelton, M. S., Professor of Practical Agriculture and Superintendent of Farm	1,800
George H. Failyer, M. S., Professor of Chemistry and Physics	1,400
Edwin A. Popenoe, A. M., Professor of Botany and Zoölogy, Superintendent of Orchards and Gardens	1,400
Jeremiah E. Platt, A. M., Professor of Elementary English and Mathematics	1,000
Albert Todd, A. M., Lieut. 1st U.S. Artillery, Professor of Military Science and Tactics	——
William H. Cowles, A. B., Instructor in English and History	1,000
John D. Walters, Instructor in Industrial Drawing	1,000
Ira D. Graham, Secretary, Superintendent of Telegraphy	1,000
George F. Thompson, Superintendent of Printing	800
Mrs. Nellie S. Kedzie, B. S., Teacher of Household Economy and Hygiene, Superintendent of Sewing	600
Mark A. Reeve, Acting Superintendent of the Workshops	600
William L. Hofer, Teacher of Instrumental Music	* 200

THE COURSE OF STUDY

Has varied but little from that adopted in 1880, and given in the last report. Students are admitted on examination in the elements of English, arithmetic and geography, as taught in the common district schools.

The following outline gives the requirements of a four-years course for the degree of Bachelor of Science:

FIRST YEAR—Fall Term.

Arithmetic.
English Analysis.
Geometrical Drawing.
Industrial.

Winter Term.

Book-keeping.
English Structure.
United States History.
Industrial.

Spring Term.

Algebra.
English Composition.
Botany, with Drawing.
Industrial.

SECOND YEAR—Fall Term.

Algebra completed.
Elementary Chemistry.
Horticulture.
Fourteen lectures in Military Science.
Industrial.

Winter Term.

Geometry.
Practical Agriculture or Household Economy.
Organic Chemistry and Mineralogy.
Twelve lectures in Military Science.
Industrial.

Spring Term.

Geometry completed, with Drawing.
Entomology and Anatomy.
Analytical Chemistry.
Farming and Gardening, or Dairying.

THIRD YEAR—Fall Term.

Trigonometry and Surveying.
Physiology.
General History.
Farming and Gardening.

Winter Term.

Mechanics.
Agricultural Chemistry.
Rhetoric.
Industrial.

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* And fees.

Spring Term.

Civil Engineering, with Drawing.
Chemical Physics.
English Literature.
Industrial.

FOURTH YEAR—Fall Term.

Agriculture or Hygiene, and Dairying.
Meteorology.
Psychology.
Industrial.

Winter Term.

Logic, Deductive and Inductive.
Zoölogy.
Structural Botany.
Industrial.

Spring Term.

Geology.
United States Constitution.
Political Economy.
Industrial.

STUDENTS.

The attendance of students has increased materially, as appears from the reports of the President, and a larger territory is represented each year. In the College year closed June 30, 1881, there were 267 students, from forty-four counties of Kansas and five other States. In the year closed June 30, 1882, there were 312 students, from fifty-four counties of Kansas and thirteen other States. In the term just opened 296 have been enrolled already — some forty more than in any previous year at this date.

Three-fourths of the students are from the homes of farmers, and carry back to their country life the strength and training gained at the College. Many of them are doing excellent work in improved farming and horticulture, while some are showing the effects of their mechanical training as first-class workmen. The principal contractors upon the new College building were former students.

The Board wishes to extend somewhat the experimental work of the College in the lines already begun and reported upon in the appended reports of the different departments, and to introduce new investigations with crops and stock breeding and feeding. For this, as special work, a small appropriation is asked.

All the current expenses of instruction and apparatus are met in full from the general income fund, as contemplated in the act of endowment, and appropriations are asked only for such matters as the organic law of the College, Federal and State, requires the State to furnish.

The following is a summary of what is asked for the years 1883–4 and 1884–5, and is believed to be essential to the welfare of the College and to good faith with the Nation:

	1883-84.	*1884-85.*
Refunding, endowment and income	$2,531 76	
Additional farm lands		$4,000 00
Completion of College hall	5,000 00	15,000 00
Greenhouse	2,500 00	
Dwelling and surroundings	7,500 00	
Library growth	1,000 00	1,000 00
Repairs and furniture	500 00	500 00
Farm experiments and stock	500 00	500 00
Total	$19,531 76	$21,000 00

FARMERS' INSTITUTES.

In closing this report, the Board wish to call attention to the series of institutes held each winter in different parts of the State under the auspices of the College, and largely at its expense. These are believed to be a potent influence for good to all interested in a stronger development of our agriculture. In each locality visited, the work has been looked upon with favor, and the College has been benefitted by a mutual association of the teachers and their patrons. It is planned to continue these until all parts of the State are reached and interested in the good work.

A full statement of all particulars in the growth and management of the institution will be found in the appended reports of the various officers of the College. All of which is respectfully submitted.

Stephen M. Wood, President,
A. J. Hoisington, Vice President,
Geo. T. Fairchild, Secretary,
D. C. McKay, Treasurer,
A. L. Redden, Attorney,
John Elliot,
V. V. Adamson,
Board of Regents.

Manhattan, Kansas, Nov. 12, 1882.

REPORT OF THE PRESIDENT, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — The year just closed has been one of gratification in most particulars. The general improvement of grounds and buildings has been noticed by friends and visitors, the place having come to be attractive for an evening drive. These improvements have been chiefly the results of slight changes in the walks and surface, adjustment of stone steps to all the buildings, and repainting of outside wood work. The growth of trees and improvement of lawns have done the rest.

The force of teachers has remained the same as in the previous year, except that Mr. John Linder, a student, has been employed to teach a small class in blacksmithing. All have been prompt and regular at the post of duty, unless detained by illness. Mrs. Cripps was ill for two or three weeks during the winter term, and Prof. Hofer was confined to his bed some four weeks, in May. In both these cases it seemed impossible to provide fully for instruction of their pupils, but the usual daily practice in sewing and in music was continued. Each professor and superintendent presents the details of his work in a full report.

The attendance of students, though apparently not quite so full as in the previous year, was far more satisfactory in stability. The average attendance was greatly increased, remaining during the fall and winter terms at very nearly 200, and at over 160 for the spring term. The whole number of students enrolled during the year has been 267, of whom 88 (not quite one-third) were ladies. Fourteen candidates for admission were rejected, on examination, as unqualified. Forty-four counties of the State were represented, as follows:

Allen	1	Doniphan	2	McPherson	2	Smith	1
Anderson	3	Douglas	1	Mitchell	4	Sumner	1
Bourbon	1	Ellsworth	2	Nemaha	1	Trego	2
Butler	6	Franklin	1	Osborne	2	Washington	5
Chase	6	Greenwood	3	Ottawa	6	Wabaunsee	20
Chautauqua	1	Jackson	6	Pottawatomie	6	Wilson	1
Cherokee	10	Jefferson	11	Rice	2	Wyandotte	2
Clark	1	Jewell	11	Riley	77	Illinois	1
Clay	10	Leavenworth	2	Rush	1	Indiana	1
Coffey	1	Lincoln	2	Saline	5	Michigan	2
Cowley	6	Lyon	5	Sedgwick	2	Missouri	3
Davis	9	Marion	1	Shawnee	13	Ohio	1
Dickinson	4						

The average age is essentially the same as last year — somewhat less than nineteen years.

Very little sickness prevailed at any time among the students, though both measles and mumps were introduced. Two cases of serious and long-continued illness appeared — one of malarial fever, and one of erysipelas, followed by abscess: neither proved fatal.

The general discipline of the College was satisfactory. In the records of weekly meetings of the Faculty, a single case of suspension for leaving College without excuse appears. No student was arraigned before the Faculty for any misdemeanor, and no serious departure from duty was reported.

Attendance upon the regular daily exercises in chapel have been, as heretofore, required, and few absences have been recorded. These exercises have been directed by Profs. Ward and Platt and myself in rotation, and attended by most of the members of the Faculty. This exercise has given opportunity for many suggestions, in brief remarks, upon the every-day life and habits of students.

During the entire year an exercise of some kind has occupied an hour of every Friday afternoon. On each alternate Friday the students meet in classes for drill in elocution. Every other Friday, all meet in chapel to listen to orations or declamations from the third and fourth-year students, or to a lecture from some member of the Faculty. Two of the lectures were given by myself, on "The Discipline of College Drill," and "The Poet's Place in the World's Workshop;" Prof. Ward gave one upon "Land Tenure;" Prof. Shelton one upon "Work;" Prof. Failyer one upon "Explosives;" Prof. Popenoe one upon "Some Relations of Insects and Plants;" Prof. Platt one upon the "History of Political Parties in America;" and Prof. Walters one upon "Industrial Education."

My own teaching has included the instruction of the fourth-year class, numbering from eight to twelve, in psychology, logic, U. S. constitution and political economy, and charge of rhetoricals of the fourth-year class, besides the fortnightly drill of one of the first-year classes. Each fourth-year student presented before the body of students two original declamations besides the commencement oration. The general ability shown and the progress made was greater than in the year previous. Every effort was made to encourage and stimulate active thought and accurate judgment, rather than simple memory of facts and authorities.

Executive duties have been manifold, but made pleasant through the kindly attention of all the Faculty. In the work of keeping accounts, added by the office of Secretary of the Board, I have been efficiently aided by Superintendent I. D. Graham, who has also kept the students' record of grades, and sent off reports of monthly examinations to parents. His assistance has been considerable, too, in preparing the annual catalogue for publication.

The system of accounts approved by you a year ago has been found very satisfactory in giving a clear view of the financial condition of the College in all its departments at the close of every month. A few slight improvements in the details of the plan have been submitted to you already, but the essential features will be maintained with even greater strictness during the coming year. I cannot refrain in this connection from expressing congratulations upon the present financial condition of the College. For the first time in our College history, the balance of the Treasurer's account is upon the right side. May it be the care of all of us to keep it there!

The expenditures under my especial direction have been as follows:

OFFICE.		
Postage, all departments	$146 75	
Stationery	21 95	
Furniture	61 26	
		$229 96
JANITOR'S WORK.		
Wages	$450 00	
Fuel	631 18	
Lights	17 00	
Tools	31 60	
		1,129 78
BUILDINGS.		
Repairs	$121 18	
Improvements	608 21	
Additions, etc., by appropriation	380 12	
		1,109 51
GROUNDS.		
Care	$54 62	
Improvement	264 77	
		319 39
COLLEGE.		
Furniture	$124 76	
Incidentals	257 72	
State fair	146 90	
Catalogue, 1877-80, (3,000)	233 50	
Catalogue, 1880-81, (2,500)	150 00	
		912 88
Total		$3,701 52

The receipts of my department for rents, sale of fuel, etc., were $562.78.

Other departments will present detailed statements of expenses and receipts, and these are all embraced in the Secretary's annual statement, already laid before you.

A portion of the incidental expenses have been incurred in connection with fencing, etc., for the new building in process of erection.

The system of advertising adopted by the Board has been carried out so far as to issue 10,000 copies of the *Industrialist*, containing the annual address of Senator S. S. Benedict. A similar edition is to be issued in August, containing in brief the Secretary's financial statement for the year; and these are sent to persons interested throughout the State. The prospect is good at this time for increased attendance, so as to make the need of the new building even more apparent than now.

In closing, I commend to your attention the statement of wants of the several departments. It seems wise that the surplus of the treasury be well expended in promoting the efficiency of our instruction. Improved means must accompany improved methods and increasing demands from the people. Provision will be needed for additional instruction, unless the officer whom you have asked from the General Government should be detailed for service here. Lieut. Todd, if detailed, would undertake teaching outside the military department sufficient to meet present demands; but in that case, provision will be needed for the new department thus organized.

The repairs and improvements authorized by you have been undertaken already, and will be completed before the opening of the College in September. A few articles of furniture will be needed to displace such as have passed into decay, or are too rude for their surroundings.

With these suggestions, I close a report, all of which is respectfully submitted.

Geo. T. Fairchild, *President.*

College, July, 1881.

REPORT OF THE PRESIDENT, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—The report of the presidential cares and anxieties for the year just closed, I am glad to present, with the feeling that this has been the most prosperous, all things considered, in the history of the College. With a greatly increased attendance, and more general maturity of mind in students, the work of the year in teaching has been especially gratifying to instructors, while the general good conduct, strict attention to duty, and freedom from any prevalent disease, have kept the great body of students zealous in their work.

The several departments have been thriving, as appears from the reports presented by the respective heads of departments. The principal changes, except in the growth there presented, are the addition of the Military Department, under Lieut. Albert Todd, who entered upon duty at the beginning of the year by detail from the United States army, and the retirement, on October 1st, of Supt. A. A. Stewart from the printing office, after nearly eight years of efficient service, to accept a more lucrative position elsewhere.

Lieut. Todd, who graduated from this College in 1872, has given efficient service in teaching classes assigned him by the Faculty outside his especial department, and in his constant sympathy with the general wants of the College. The military drill and tactics have been taken by students at their option, but a strict attendance is required of all those who undertake these duties. More than one-half of the male students of the College have been enrolled in the companies, to marked improvement in general appearance and personal bearing. An armory has been fitted up in the room heretofore devoted to society work, and seventy-five cadet rifles, with accoutrements, have been obtained from the United States War Department. So far the department has made its way without friction. The Faculty have added to the curriculum, with your approval, a course of twenty-eight lectures in general knowledge of military affairs.

The Printing Department has been fortunate under the supervision of Mr. Geo. F. Thompson, a former student, whose training in this office during more than two years of our course enabled him to take up and carry on without diminution of interest or efficiency the work which Mr. Stewart so unexpectedly dropped. All express gratification that the Board have given him the appointment as Superintendent.

In the Department of Chemistry, and in the carpenter shop, the increased number of students has called for assistance in instruction, which has been supplied by Mr. J. T. Willard and Mr. M. A. Reeve, both students in the fourth year of the course, who have given special attention to the branches in question. Mr. J. Linder, a student of the second year, has acted as foreman of the blacksmith shop, as for two years previous, under the general supervision of Superintendent Hawkes, of the Mechanical Department.

The Department of Horticulture has had more efficient help in Mr. A. Winder, employed as foreman during the whole college year, and Mr. Thos. Bassler, a student of some experience in green-house work, who has been employed since December last in hours not occupied by his studies. The general effect of such aid appears at a glance.

The Farm Department has been deprived since April 1st of very efficient service by the removal to another State of Mr. T. B. Morgan, whose familiarity with details through many years made his work most satisfactory. Mr. W. S. Myers, who takes the vacant place, is a graduate of the College, who, it is hoped, with experience may do good service.

The general condition of the College machinery has been excellent. Some five hundred readable books have been added to the library by purchase, and a general classification of the books upon the shelves has aided in their use. The library has been much frequented. It has for some time needed the improvement in shelving just provided for, and will need another year more of responsible oversight than has been possible with the present corps of teachers. Unless a large increase of students should prevent it, the additional instructor provided for by your foresight will enable several of the professors to give some time to the library and its use.

The cabinet cases for the Department of Botany and Zoölogy are complete, and specimens are arranged in them. The purchase of Prof. Whitman's collection of shells enables the professor in charge to display them with other materials to better advantage. It seems desirable that this cabinet should be increased, as opportunity offers, by good specimens of all our native animals. The funds devoted to such a purpose become a permanent investment, of profit to generations of students.

The room hitherto used as a chapel has been crowded to its utmost capacity for a part of the year, when two hundred and forty-eight students gathered there daily. We shall gladly move "out of the old house into the new" at the opening of the next year. The daily chapel exercises, continuing fifteen minutes, have been under the charge of Prof. Ward, Prof. Platt and myself in rotation, the other members of the Faculty having been very constant in their attendance. The students have been required to attend daily, and but few cases of unnecessary absence are recorded. This exercise affords opportunity for many suggestions as to general deportment and advancement.

Once every month a public lecture of an hour has been given. The lectures of the past year have been as follows:

"Science in Everyday Life" and "College Economy"	Pres. Fairchild.
"Character Building"	Prof. Ward.
"Japan and its History"	Prof. Shelton.
"Biographical Sketch of Arago"	Prof. Failyer.
"Education for the Arts"	Prof. Walters.
"Words"	Prof. Todd.
"Scientific Progress"	Supt. Graham.
"The Needs of the Age"	Mrs. Cripps.
"Russian History"	Prof. Canfield, of the State University.

The several societies connected with the College have been prosperous, and the students' prayer meeting, led by Professor Platt, has been largely attended. The Scientific Club has made considerable additions to its collections, having nearly filled the case provided by the Board for its use. No course of evening lectures has been possible, for lack of a suitable room; but two or three times in each term the students and Faculty have met for an evening social entertainment in some one of the College halls, music or recitations or dialogues forming a part of the programme. These are in charge of a committee of the Faculty, and have proved a help to the general discipline of the College.

The usual rhetorical exercises have been held, distributed under the charge of the different professors into six classes, meeting on each alternate Friday afternoon. The fourth-year students have given, in addition, several orations before the body of students, and the third-year students, declamations.

Weekly Faculty meetings have been held, before which all matters of general discipline and policy have been presented. No occasion for severe discipline has been felt. In two instances the parents of students were requested to remove them from College until they should show a more studious and docile disposition.

The whole number of students during the year has been 312 — 224 male, and 88 female — 45 more than in the years 1880–81, and 36 more than in any previous year. The whole number of students ever connected with the College is 1,929 — 1,273 males, and 656 females. Fifty-four counties of this State, and thirteen other States, have been represented, as shown in the following table:

COUNTIES.

Anderson	2	Davis	6	Marion	2	Rice	1
Atchison	3	Dickinson	3	Marshall	3	Riley	90
Barbour	1	Douglas	4	McPherson	3	Rush	1
Barton	1	Ellsworth	2	Mitchell	3	Saline	3
Bourbon	1	Elk	1	Montgomery	1	Shawnee	16
Brown	2	Franklin	4	Morris	1	Stafford	1
Butler	2	Greenwood	6	Nemaha	2	Sumner	2
Chase	1	Jackson	6	Osage	2	Trego	3
Chautauqua	2	Jefferson	14	Osborne	1	Washington	11
Cherokee	3	Jewell	6	Ottawa	5	Wabaunsee	16
Clay	18	Johnson	5	Pawnee	1	Wilson	1
Cloud	1	Labette	3	Phillips	1	Wyandotte	1
Coffey	1	Leavenworth	5	Pottawatomie	7		
Cowley	4	Lyon	2	Republic	1		

STATES.

Arkansas	3	Indiana	1	Missouri	3	New York	1
Colorado	1	Iowa	1	Nebraska	2	Ohio	1
Illinois	4	Michigan	1	New Mexico	4	Pennsylvania	1

England 1

The average age of students has gradually increased with the increase of numbers and the wider range of territory furnishing students. The gain this year has been a half year upon that of the year previous, and a whole year upon the average of five years previous. The following figures give the averages for the past eight years:

Year.	*Age.*	*Year.*	*Age.*
1875	18.30	1878–79	18.61
1875–76	17.70	1879–80	18.86
1876–77	18.12	1880–81	18.84
1877–78	18.16	1881–82	19.35

The students were classed as follows: Fourth year, 11; third year, 19; second year, 50; first year, 227; special courses, 5. Of the 312, 198 were here for the first time this year. Nine only completed the four-years course and received the degree of B. S.: J. Chester Allen, Beloit, Mitchell county; Ida Cranford, Brookville, Saline county; Edward V. Cripps, Manhattan, Riley county; Warren Knaus, Buffalo, Wilson county; Mattie E. Mails, Blue, Pottawatomie county; Allie S. Peckham, Manhattan, Riley county; Belle Selby, Garnett, Anderson county; Burton L. Short, Crestline, Cherokee county; John A. Sloan, Wakefield, Clay county. Two graduates of more than three years' standing received the degree of Master of Arts upon presenting a satisfactory thesis or oration: Albert Todd, A. B., 1872; Harry A. Brous, A. B., 1874.

During the months of January and February a series of six Farmers' Institutes was held, in as many counties. Glasco, Cloud county; Clay Center, Clay county; Burlington, Coffey county; Burlingame, Osage county; Great Bend, Barton county; Holton, Jackson county, were the places selected for this year. In these, Professors Ward, Shelton, Failyer, Popenoe, Walters and myself took part, and felt the series to be on the whole a successful inauguration of an effort for closer relations between the College and the farmers of the State.

My personal duties, aside from a constant oversight in all matters pertaining to the general welfare, and especial responsibilities in connection with the construction and furnishing of the new building, have embraced the teaching of the fourth-year class in psychology, logic, political economy, and United States constitution. The class has averaged twelve members during the year, and satisfactory work has been done by them all. I have also had charge of the lowest class in the first year in rhetorical exercises, a class numbering about fifty. The work in this class has been entirely elocution—drill in correct, distinct, emphatic reading and speaking. I have taken my regular turn, once in four weeks, with other members of the Faculty, in editorial work upon the *Industrialist.* Incidental work has been: A short address before the State Teachers' Association, addresses before the State Horticultural Society, and at four of our six institutes, two articles for quarterly report of the State Board of Agriculture, the baccalaureate sermon, and the preparation of a paper for the meeting of the National Educational Association in the coming July.

The keeping of accounts as Secretary of the Board, and the regular correspondence of the office, have been unusually burdensome from increase in bulk and variety. I am grateful for the prospect of more assistance from the Superintendent of Telegraphy as bookkeeper.

My duties, *ex-officio*, as member of the State Board of Education, have called me to meetings of that body four times during the year, besides the work of conducting the annual State examination. All expenses connected with this work have been borne by myself personally, since the State, by an act creating the Board of Education, is prohibited from meeting them.

The expenditures under my especial charge as executive have been: In cash, $3,536.49; through other departments, $834.10; total, $4,370.39—distributed as follows:

OFFICE.		
Postage	$207 50	
Stationery	50 05	
Furniture	2 25	
		$259 80
JANITOR.		
Wages	$450 00	
Fuel	724 07	
Lights	23 25	
Implements	19 50	
		1,216 82

BUILDINGS.		
Repairs	$489 75	
Improvement	377 49	
		867 24
GROUNDS.		
Care	$97 15	
Improvement	203 40	
		300 55
GENERAL COLLEGE.		
Furniture	$297 03	
Incidentals	139 00	
State fair	87 85	
Annual catalogue	176 10	
Advertising editions of Industrialist	126 20	
Litigation	110 05	
New land	666 50	
Farmers' Institutes	123 25	
		1,725 90
Total		$4,370 39
RECEIPTS.		
Rents	$230 10	
Sales of fuel, etc	73 28	
Bills for postage to other departments	35 18	
		338 56

The inventory is increased $1,511.65, but the actual improvement is far greater.

Of the total expenditures, $353.67 has been charged to the State appropriation for repairs and furniture; the rest has come from the income fund.

In conclusion, I cannot but express my gratification at the unity with which the Faculty have labored to make all the work go forward with success to all concerned. The fact that many of the members live at a distance from the grounds, has now and then interfered with the best work, and added somewhat to executive duties; but all have put their energies into their tasks. Respectfully yours, GEO. T. FAIRCHILD, *President.*

REPORT OF THE PROFESSOR OF HIGHER ENGLISH AND MATHEMATICS, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—The following brief report of the work done in the Department of English and Mathematics for the collegiate year 1880–1881 is respectfully submitted.

My time has been about equally divided between the classes in mathematics and English. In addition to the classes named in the accompanying tabular view, I have had charge of the students of the second-year class in rhetoricals, meeting them once in two weeks. The class numbered forty.

During the past year my classes have all been larger than ever before. The critical examination of essays and other exercises prepared by so many students, requires each week many hours of patient, hard work outside of the recitation room. This I have not been able, frequently, to give, because the business of the Loan Commissioner demanded immediate attention. I have done the best I could under the circumstances, but I am conscious that all through the year the work in the Department of English has not been what it ought to have been. Too many duties, too much work, is required of me, both for the interests of the College and for my own reputation.

With large classes in English and mathematics — two departments widely separate — the general oversight of the library, and the investment of the College funds to look after — a matter of $80,000 annually — it will be impossible for me or any other man to do the work as it must be done. I respectfully ask the Board to take this matter under consideration with reference to the future.

TABULAR VIEW OF CLASSES, 1880–1881.

Classes.	*Males.*	*Females*	*Totals by classes.*	*Totals by terms.*
FALL TERM.				
Algebra completed	28	16	44	
Geometry completed	8	5	13	
English analysis (two divisions)	44	32	76	133
WINTER TERM.				
Geometry commenced	23	13	36	
Trigonometry and mechanics	12	1	13	
English structure (two divisions)	54	28	82	131
SPRING TERM.				
Algebra commenced	38	27	65	
Geometry completed	20	10	30	
Surveying	7	....	7	
English composition	28	25	53	155

On account of a change in the curriculum, I was obliged to take the fourth-year class through a hurried course of mathematics, going over geometry, trigonometry, mechanics and surveying in one year. The classes however did remarkably well, leaving the College with perhaps more practical knowledge of mathematics than any class that I have instructed. Some members of the class have already secured good positions in engineering corps.

The last change that was made in the course of study is found on trial to be very satisfactory. The essentials for the successful prosecution of a course in mathematics are, (*a*) accuracy and rapidity in the use of numbers; (*b*) an understanding of the equation as an instrument to aid in mathematical investigation; and (*c*) sufficient knowledge of drawing, so that a mathematical problem can be readily represented by a diagram. These qualifications are usually possessed by our students when they reach geometry in the second term of the second year of our course. From this time onward their progress is rapid.

The importance of algebra in a practical course of study is not generally appreciated. It is often asked, of what use is algebra to a farmer or mechanic? To a mechanic who works by the "rule of thumb" or to a farmer who works by no rule at all, algebra is of no use. But the educated farmer or mechanic well knows that he could not have become educated without algebra. No man can obtain the higher practical education without a knowledge of algebra. No progress in mathematics, beyond arithmetic, is possible without a knowledge of algebra. Algebra is the gate by which one enters the vast domain of the higher mathematics. By it geometrical theorems are demonstrated and trigonometrical principles established. No one can pass beyond the mere elements of chemistry or physics without a knowledge of algebra. The hand-books of all the arts and trades are full of algebraic formulas. In short, a thorough knowledge of algebra is as indispensable a preparation for a scientific farmer or a first-class mechanic or engineer, as is a knowledge of the multiplication table to an accountant.

Algebra should not be regarded as a merely disciplinary study; it is of as much practical use as any study in the course.

The class that completed algebra in the fall term studied geometry in the winter term, and also the spring term in connection with drawing, which was taught then by Professor Walters. This class I consider better prepared to take up the subsequent part of the course in mathematics than any class I have taught in previous terms, because they have acquired the essentials mentioned above, and in addition have developed both the faculty of reasoning and that of imagination by the study of geometry and drawing.

With the exception of the rhetorical exercises of the second-year class, my teaching in English has been restricted to the students of the first year. Of them I have had charge during the whole year. The first two terms the class was so large I was obliged to divide it into two divisions.

This first-year class in English was composed of those who passed the entrance examination and those from the "B," or preparatory, class of the preceding year. As a general rule, those coming from the "B" class were better penmen, quicker to express their thoughts on any familiar subject, than others. The whole class were quite familiar with the nomenclature of technical grammar, and could give the book definitions of the terms used. They could define the parts of speech, but could not rapidly name them in a sentence. They could define a transitive verb, but were not quick to distinguish whether a verb is used in a transitive or an intransitive sense, or not. They possessed considerable skill in diagraming a sentence, and delighted to show it.

After listening to the explanation of some obscure construction, the question would often be asked by the class, How would you diagram that sentence? They could tell whether a line should be turned to the right or to the left in a diagram of a sentence, and were ready to discuss such questions, but manifested little interest in the choice of words or the arrangement of words to express a given thought. I first tried to find out how much the class actually knew of English grammar; second, to teach them to apply what they knew. The work of the first month was somewhat discouraging to the pupil, and trying to the patience of the teacher. It was a review of etymology and some of the most important rules of syntax.

At the close of the month, some examination questions were prepared and answered, modeled somewhat after the usual examination for a certificate to teach a district school. The work of the first month had reference to the fact that many of the class wanted to become teachers, and the aim was to prepare them for the usual examinations required.

The analysis of sentences was next taken up, with a view of comprehending the thought expressed; next, the analysis of discourses, with a view of understanding how the subject was treated by the author. Daily exercises in the art of expression were required, and criticisms of everything written, by the members of the class.

The greater part of the second term was devoted to the structure of English words, Swinton's Word Analysis being used as a text-book. The meaning of the principal prefixes and suffixes used in forming derivative words, the laws of combination, their origin, how they came to be used, were taught. The class were taught how to distinguish the Saxon from the other elements in our language, and how our language came to be what it is. The subject of synonyms was taken up. The class were taught the Latin and Greek numerals, and how to recognize them in derivative words. They were also taught about one hundred Latin and Greek roots, selected with reference to the terms used in botany, chemistry, and physiology. They were taught how to trace words to their roots and get at the primary meaning—in short, were taught how to use an unabridged dictionary.

The object aimed at in this direction was to prepare them to easily comprehend the terms used in science, preparation which is popularly believed to be obtained only by the protracted study of Latin and Greek.

The last term of the year, the class studied the excellent work of President Hill on composition, and the elements of rhetoric.

The results of the year's work have on the whole been satisfactory, but much more could have been done for individual members of the class, had their teacher been able to give them more personal attention.

Respectfully, M. L. Ward,
Professor of English and Mathematics.

REPORT OF THE PROFESSOR OF MATHEMATICS AND ENGLISH, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I respectfully submit a brief report of my work as an officer of the college for the year ending June 30th, 1882.

During the year I have taught classes in algebra, geometry, trigonometry and surveying, mechanics, civil engineering, English analysis, English structure, and English composition.

I have had charge of the rhetorical exercises of the fourth-year class, including their preparation for commencement. During the last three weeks of the second term I gave the first-year class twelve lectures on commercial law, as a supplement to their course in book-keeping.

I submit a schedule showing the number of students enrolled in the classes just mentioned, and the numbers examined at the close of each term.

The number enrolled were, for the first term 147, the second 176, the third 181.

About 87 per cent. of those enrolled were examined. The classes were all larger than I have had in previous years, and of course the work was proportionately heavier. Especially during the last term of the year, I found it utterly impossible to accomplish what I desired for the class in English composition. The class numbered 63, and when I called for essays they came upon me in overwhelming numbers.

The division of my department has become an absolute necessity.

The methods of instruction followed in my department I have heretofore pursued, and I need not report. I am happy to say that the classes of each succeeding year do more and better work. They come to the various studies in the college course with a better preparation each year.

As Librarian, I have had general supervision of the library. The report of Librarian gives work in detail.

As Loan Commissioner, I have drawn during the year ninety-eight warrants on the College Treasurer, for sums aggregating $83,298.72.

I have generally met the monthly call for copy from the compositors of the *Industrialist.*

Nearly one-half day of each week has been spent at the regular Faculty meeting.

I attended three of the six Farmers' Institutes in which the College was represented last winter. Respectfully, M. L. Ward.

SCHEDULE OF CLASSES, 1881-82.

Classes.	ENROLLED.			EXAMINED.		
	Males.	*Females*	*Total.*	*Males.*	*Females*	*Total.*
FIRST TERM.						
Algebra	34	18	52	30	15	45
English analysis	40	26	66	36	23	59
Trigonometry and surveying	16	1	17	13	1	14
Rhetoricals	8	4	12	8	4	12
Totals	98	49	147	87	43	130
SECOND TERM.						
English structure	74	33	107	56	25	81
Geometry	28	15	43	24	14	38
Mechanics	15	....	15	13	....	13
Rhetoricals	7	4	11	7	4	11
Totals	124	52	176	100	43	143
THIRD TERM.						
Algebra	44	20	64	40	16	56
English composition	44	19	63	41	17	58
Geometry	24	13	37	22	12	34
Civil engineering	7	....	7	7	....	7
Rhetoricals	6	4	10	5	4	9
Totals	125	56	181	115	49	164
Grand totals	347	157	503	302	135	437

REPORT OF THE PROFESSOR OF PRACTICAL AGRICULTURE, 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—Your attention is respectfully invited to the following brief sketch of operations in the Farm Department for the year ending June 30, 1881.

The work done in this department may be properly classified under two heads, namely, instruction given to classes, and the management of the College farm and stock, including experiments.

During the year covered by this report I have taught six different classes, as follows: A class in advanced agriculture, during the fall term, numbering seven students of the fourth year, and during a month of the same term I gave a course of lectures on dairying to a class of six young ladies of the fourth year; a class in elementary agriculture, taught during the winter term, and numbering twelve students of the second year; a class in general history, in the spring term, numbering sixteen students of the third year, and during three weeks of the same term I gave a course of lectures on anatomy to a class of sixteen students of the second year.

During the entire year, the third-year class has been in my charge for instruction in rhetoricals. This class has had fortnightly meetings for drill in declamations and compositions, and each member of the class has had the privilege of declaiming twice in the chapel, before the assembled students and Faculty.

In regard to the course of instruction given in this department, it seems unnecessary for me to give in detail the topics taught, inasmuch as this has been done very fully in the previous reports and in the College catalogue for the current year. Certain changes have been made in my course in agriculture and stock-breeding, to which reference may be appropriately made. Heretofore the subject of stock-breeding has been taught wholly to the second-year class, but during the past year the principles of breeding, always a difficult subject for young students, has been omitted from the course of study of the second year, and will hereafter be taken by the fourth-year class. In place of this, the second-year class has received lectures on the "History of Agriculture," "The Tame Grasses," and other subjects before given to the senior class.

In regard to my course of instruction in agriculture, I am free to say that it is far from satisfactory to me Lecturing on agricultural topics is not agriculture, and will not necessarily awaken an interest in agricultural life, however practical and intrinsically useful the instruction may be. Lecturing on stock-breeding, even when the herd is brought before the students, and when the peculiarities of breeds and individuals are carefully pointed out, will not furnish to the student that equipment of knowledge and enthusiasm with which he may hope to prosecute the business of stock-raising successfully. Something else is wanted, and in a large number of cases this something is furnished by home influence and training, and in particular by the knowledge and taste acquired in the operations of the farm before entering college. Ought not this Agricultural College to be able to give its students something more than the theories and principles underlying agriculture? is a question well worth the attention of the friends of this College. I have no particular remedy to suggest for the condition of things, although it has seemed to me that a regular system of labor upon the farm, which shall embrace every male student, is indispensable to the successful teaching of agriculture. I am aware that this idea has long been fiercely combatted, but I am confident that this principle has to-day a stronger hold upon the minds of educators, and particularly the teachers of agriculture and horticulture, than ever before. I had during the last vacation the pleasure of attending a meeting of the teachers of agriculture and horticulture of the United States, held at the Michigan State Agricultural College. At this meeting the question of paramount interest and importance was the employment of students in the manual operations of the College farms.

Among the teachers there assembled there were wide differences of opinion as to means and methods; but the absolute necessity for a systematic course of labor upon the College farm was confessed by all those teachers who believe that the agricultural college should send back to the farms of the State not merely good citizens and thoughtful farmers, but skilled agriculturists.

The growth and general acceptance of this idea is strikingly shown in the case of those agricultural colleges of recent organization. The Colorado Agricultural College compels all students to work, I believe, three hours per day—that of Mississippi the same—thus following very closely the plan so long and so successfully practiced in Michigan—while the Ontario (Canada) Agricultural College compels all students to work five hours daily upon the College farm. It must not be inferred from this that students are not employed in the operations of our own College farm. They are thus employed, and in considerable force; but our system, or lack of system, is complicated by the numerous other industrials and extra-college exercises, which seem likely to be increased in the near future, but which now make work upon the College farm most unsatisfactory to both teachers and students.

During the year I have had the general management of our college paper, the *Industrialist*, which has been issued regularly except during vacation. The work upon the editorial page of the paper has been equally divided among the Faculty, an arrangement that has been satisfactory to all concerned. I am particularly indebted to Professor Walters, who, in addition to his regular work upon the paper, has furnished a column of matter upon educational affairs, besides giving valuable assistance in reading exchanges.

I have within the year covered by this report given a number of addresses and lectures at farmers' institutes, granges and other farmers' meetings, and have received a number of invitations to give addresses at fairs and other gatherings held at remote points in the State, which my duties to the College seemed to warrant me in declining.

THE FARM.

In the subjoined table are given the general results obtained with all those crops grown in amounts sufficient to allow fair and accurate account to be kept with each. In this table, the items of cash in each crop refer only to the labor actually expended in production, and the value of seeds, no account being taken of taxes or interest on the value of the land.

CROP OF 1880.	*No. of acres.*	YIELD PER ACRE.		COST.	
		Bush.	*Tons.*	*Per bushel.*	*Per ton.*
Corn	22	55	....	$0 13	....
Corn (late-planted, for fodder)	5	29.6	....	18	....
Wheat (winter)	18	9.6	....	60	....
Oats	4.5	28	....	17	....
Millet	10	....	1	....	$5 19

The very light yield of wheat and oats shown in this table are chargeable to the very dry weather and tremendous wind-storms which prevailed till late in the spring. A large proportion of the oats sown came to naught, the seed having been literally blown away by the high winds. The ground was subsequently replowed, and planted with corn, with the object of securing a crop of fodder. In addition to the valuable crop of fodder, a fair yield of grain was secured. Very dry weather again, late in July and early in August, did irreparable damage to a very promising field of Golden millet.

It will be seen from all this, that a good degree of success was obtained only in the cultivation of corn, all other crops costing fully as much as the grain they yielded was worth. Nevertheless, if we consider the great value of the straw for fodder, which was secured in excellent condition, and the advantage of a variety of crops in the distribution of the labor of the farm, even these moderate crops were worth more than they cost.

BUILDINGS AND FENCES.

In addition to maintaining the buildings and fences of the farm in a good state of repair, valuable additions to the permanent improvement of the farm have been made. The portable fence covering the sides of the eastern twenty acres of the old College farm has been removed for use upon the lower, or College farm proper, and a good permanent board fence three boards high has been erected in its stead. North of the Societies' Hall a strong double fence, four boards high, forming a lane between the hall and the road passing along the north side of the College farm, has been constructed. The ground occupied by the new building now in course of construction, and materials used, has been surrounded by a barbed-wire fence, and the yard thus formed has been connected with the road west of the College farm by a lane formed on one side by a barbed-wire fence. This lane has been constructed for the exclusive use of teams and workmen employed on the new building, and has been a great convenience to all concerned.

It may not be amiss to remark in this connection, that the best and cheapest fence, so far as protection from cattle and horses is concerned, is the common barbed-wire fence, with not less than three wires, and posts eighteen to twenty feet apart. I may add that in our experience the common board fence, however made, is the most expensive, least safe and least durable fence that we have used. The corn crib formerly located in front of the piggery has been removed to a position north of the barn; and I recommend the removal, at an early date, of the piggery to its proper position north and somewhat west of the barn. I also advise that the foundations of the new piggery be constructed of masonry sufficiently strong to support a stone superstructure, which ought, before many years, to take the place of the present wooden structure.

STOCK.

Our herds have been almost entirely exempt from sickness during the year, and are now in almost perfect health and vigor. Constant additions have been made to the herd in the natural way, but beyond this no material changes have been made.

Our sales of stock have been very considerable, amounting in the aggregate to $1,385.70. Among the particular items under the head of stock sales I may mention the sale of four Short-horn heifers at an average price of $200 each. As illustrating the fact that stock-raising does pay in Kansas, I may mention the fact that our stock account in the last year stands charged with $1,338.18, and is credited with $1,701.06 exclusive of increase.

A very valuable Bates-bred Short-horn cow and heifer calf, the only considerable purchase made during the year, have been secured upon terms very advantageous to the College.

IMPLEMENTS AND HARNESS.

Beyond a new Climax mower, obtained through the kindness of the agent, Mr. E. B. Purcell, at a reduced price, and sundry small tools purchased from time to time, no important additions have been made to our stock of implements. A much-needed set of double harness has been purchased, at a cost of $29.

In addition to the regular work of the farm, the department has done a good deal of grading about the College buildings, and all of the considerable grading and road-making done during the year upon the College grounds.

EXPERIMENTS.

Pig Feeding.—To test the value of warm, sheltered pens in feeding swine, an experiment was made with ten Berkshire pigs, five of which were kept in warm, sheltered pens in the basement of the barn and five in open yards without protection.

The experiment was begun on November 1st, and was carried on for exactly eleven weeks. The two sets of pigs were treated precisely alike as to feed and in all other respects, except shelter and protection from the elements. I may be excused from giving the details of this experiment, which have already been published in the Second Biennial Report of the State Board of Agriculture of Kansas for 1879-80, where they nearly fill six closely-printed pages. The general results of this experiment may be concisely shown in the annexed table:

		Total increase.	*Total corn consumed.*	*Total bran consumed.*	*Corn consumed for each 100 lbs. live weight.*	*Bran consumed for each 100 lbs. live weight.*	*Corn consumed for each 1 lb. of increase.*	*Bran consumed for each 1 lb. of increase.*
Feed, corn....	Pens 1, 2 and 5 in the barn...........	483.00	2,487.50	....	22.03	....	5.15	....
	Pens 6, 7 and 10, in open yard....	418.00	2,291.00	....	21.64	....	5.48	....
Feed, corn and bran...	Pens 3 and 4, in the barn..........	330.00	1,589.00	232.00	21.09	4.13	4.81	0.70
	Pens 8 and 9, in the open yard...	240.00	1,386.50	200.00	19.82	4.14	5.77	0.83

In the experiment, 100 lbs. of increase, it will be noticed, cost in the open, exposed pens 33 lbs. more of corn, where corn exclusively was fed, than in the warm, sheltered pens; and where a mixed diet of corn and bran was used, the warm pens yielded 100 lbs. of increase for 96 lbs. of corn and 13 lbs. of bran less than was required for the same increase in the open yards.

My report of this experiment has been very extensively copied by the agricultural press of the country, with many positive expressions as to the value of the work. Among others, the *National Live Stock Journal* remarks editorially of this experiment, that it is "one of the most valuable and interesting experiments that we have seen an account of for many years."

Fish Culture.—Our experience in the growth of food fishes is limited to a single species, namely, German carp, obtained from Hon. D. B. Long, Fish Commissioner of Kansas. Early last spring a pond, irregular in shape, but having an area not far from 15x16 feet, was dug in a springy piece of ground, southeast of the barn, where water two to four feet in depth was obtained, at a total cost of $25. On the 18th of April the pond was stocked with thirty young carp, averaging about two inches in length, which came originally from the Government hatcheries, at Washington. The fish have been fed, on an average, two or three times each week, with bread crumbs and the solid materials obtained from the bottom of the swill barrel, and so far, they seem to have thrived abundantly in their new home. I have recently taken specimens from the pond six to eight inches in length, and weighing one-half to three-fourths of a pound. Our experience with carp-raising is too limited to allow me to make any very positive statements concerning it; nevertheless, I do feel confident that any person in Kansas having a proper locality for a pond, secure from overflow, and deep enough to protect the fish from the danger of freezing in the winter season, may grow carp as easily as chickens are grown.

Harrowing Growing Wheat.—Six plats, each exactly one-fourth of an acre, were laid off in a portion of the wheat field which was very uniform as to soil and the growth of the wheat plants. Each alternate plat was harrowed on February 26th, and harrowed and rolled again on April 13th. The remaining three plats receiving no special treatment. Thomas's smoothing-harrow was the implement used. The following table shows the general result of the experiment:

Treatment.	Plat A.		Plat B.		Plat C.		Plat D.		Plat E.		Plat F.		Av. yield per acre.	
	Grain, lbs.	*Straw, lbs.*	*Grain, lbs.*	*Straw, lbs.*	*Grain, lbs.*	*Straw, lbs.*	*Grain, lbs.*	*Straw, lbs.*	*Grain, lbs.*	*Straw, lbs.*	*Grain, lbs.*	*Straw, lbs.*	*Grain, bush.*	*Straw, lbs.*
Harrowed.........	257	440	....	....	186	305	....	....	242	418	....	....	15.21	1,550
Not harrowed...	....	....	179	301	....	....	178	324	....	....	218	457	12.77	1,442

This difference of $2\frac{45}{100}$ bushels of grain and 110 pounds of straw per acre in favor of the harrowed plats is not large, it must be confessed, but it is very large pay for going over the ground twice with a light harrow, and once with the roller.

I may point the moral of this experiment—an important one, I believe—that small gains like the above make all the difference between cultivation at a loss and with a profit. A little more or better work done not unfrequently determines the result of all previous work done in the field.

SHRINKAGE OF WHEAT IN THE BIN—For the purpose of determining this point, a long sack holding exactly 200 pounds of wheat was prepared, and the whole sunk, November 12th, 1879, as far as possible into the grain, in order that the wheat in the sack might fairly represent the average of that in the bin. In exactly six months the sack of grain was taken from the bin and carefully weighed, this second weighing giving to the contents of the sack 200¾ pounds of wheat. This experiment has been repeated the past year, when a 200-pound sack of wheat was again (November 13, 1880,) sunk in a bin of wheat, and was allowed to remain until June 14th, 1881, when it was again weighed, and the second weighing showed 201 pounds for the contents of the sack. These results, which can hardly be called coincidences, seem to show pretty conclusively that wheat put in a granary in a very dry state, as ours was, certainly does not lose in weight during the winter season. This experiment will be repeated during the coming year.

SMALL GRAIN AND FORAGE PLANTS.—I had hoped in this report to be able to furnish some facts of value concerning the growth in Kansas of a large number of different varieties of spring wheat, oats, barley, and millet. Among the spring wheats sown during the spring of 1880 were China, Grass, White Russian, Champlain, Defiance, and Mediterranean, and a still larger number of varieties of oats and barley. They were sown early in the spring, but, shortly after seeding, the terrific wind-storms of that season swept away not merely the grain but the soil enveloping it, to the depth of two and three inches. The few scattering plants that fully grew later in the season were destroyed by chinch bugs.

PEARL MILLET.—This we have tested in a small way during the year. Our method of cultivation has been to sow the seed in drills thirty inches apart, cultivating between the rows about as corn is usually worked. With this treatment, pearl millet has given us an immense yield of valuable fodder. The stalks when full grown vary from six to eleven feet high, and so rapid and vigorous is its growth that moderate drouth and chinch bugs do not materially injure it. The chief obstacle to the general cultivation of this plant will ever be the difficulty experienced in curing it for fodder.

GOLDEN OR GERMAN MILLET.—This we have grown to the amount of ten acres during the past season, and in less amounts during previous years. Golden millet differs from the common millet in several particulars, but especially in its coarse habit of growth. It also requires nearly a third more time to make its growth than does the common millet. From the fact that it requires the richest soils to develop it, together with a constant and uniform supply of rain, it can never be as useful to the farmers of Kansas as the common variety.

In concluding this brief report of operations upon the College farm for the past year, I should say that this report covers by no means all the facts of value growing out of particular experiments or the general experience of the farm. Much of the work upon the College farm I have felt at liberty to report from week to week through the columns of the *Industrialist*, feeling that if our experience was valuable, the sooner it was laid before the public the better.

In this fickle climate the whole work of experimentation is hedged with difficulties. I have already referred to the destruction of a portion of our work by untimely weather. In actual fact, the experiments referred to in this report are only a very small part of those that have been undertaken. For example, twenty-three sorts of winter wheat were sown last fall: at the present time all appear to have winter-killed, except perhaps three or four sorts. A continuation of our experiments in harrowing wheat has come to an end by an invasion of chinch bugs, which have destroyed several of the plats outright.

For a number of years we have endeavored to show the effect upon the *grass* and flour of wheat of cutting the *grass* when green, moderately ripe, and very ripe. We have always been thwarted in our efforts by very dry weather early in the spring, followed by copious rains, which ripened the grain so unequally as to make it impossible for us to secure good specimens of wheat of different degrees of ripeness. I could, if it were necessary, mention many other instances where our efforts have come to nothing from causes beyond our control. That this will be an ever-present difficulty in the future, I have no doubt.

FINANCIAL STATEMENT

Of operations on the College farm, for the year ending June 30, 1881.

DEBIT.	
To vouchers approved	$2,082 44
To amount of valuation, June 30, 1880	6,983 75
Total	$9,066 19
CREDITS.	
By amount of sales of stock and produce	$1,672 17
Amount of valuation, June 30, 1881	7,546 00
Amount expended in experiments	83 72
Amount expended for office and class	9 15
Amount expended in permanent improvements	269 52
Total	$9,520 56
Balance	$454 37

ABSTRACT OF INVENTORY.

	1880.	*1881.*
Horses and mules	$450 00	$450 00
Cattle—Short-Horns	3,550 00	3,800 00
" Jerseys	525 00	690 00
" One cross-bred	25 00	....
Swine—Berkshire and Essex	730 00	750 00
Implements and harness	920 45	831 65
Grain	....	273 50
" Corn	37 50	....
Hay	....	60 00
Crops in ground	404 55	253 85
Fish pond	....	25 00
Office furniture and herd-books	341 25	412 00
Total	$6,983 75	$7,546 00

Respectfully submitted.

E. M. SHELTON,
Professor of Agriculture, and Supt. of the Farm.

REPORT OF THE PROFESSOR OF PRACTICAL AGRICULTURE.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I hereby offer for your consideration a report of operations in the Farm Department for the year ending June 30, 1882. As usual, my work must be stated under two heads: 1. Work done in the class-room; 2. The management of the College farm.

During the year eight different classes have been in my charge, for varying periods of time. In the fall term my classes were as follows: Twenty-two students of the third year in physiology, the young men of the fourth-year class, numbering six, in agriculture, and a class of seven young ladies, mostly of the fourth year, to whom a course of lectures in dairying was given during the last month of the term. In the winter term two classes were taught—a class of first-year students, numbering 44, in United States history, and the young men of the second-year class, numbering 35, to whom a course of lectures in agriculture and stock-breeding, lasting through the term, was given. In the spring term I gave a three-weeks' course of lectures in anatomy, to a class of 25 students of the second year. During the entire year I have had charge of the rhetorical exercises of the third-year class, numbering 22 students, who had regular fortnightly exercises through the year. Each member of this class also declaimed publicly in the College chapel twice during the year, and from this class those students who took part in the undergraduates' exhibition of commencement exercises were selected. A class in "Farming," composed of students who took as their "Industrial" work in the College farm, was organized at the beginning of the fall and spring terms. During the fall term this class numbered 15 students, with a less number in the spring term. In all of these classes good work has been done by the great majority of their members, and reasonably satisfactory progress has been made. In regard to the course of instruction given, I have no marked changes to report.

My lectures in agriculture and stock-breeding I have revised from time to time, with increased experience and knowledge of these subjects. In my class in physiology a new text-book—Dr. Martin's "Human Body," a much larger and more complete work than the text-book heretofore in use—has been introduced, to the satisfaction of all concerned.

In addition to the class work above referred to, I have had the general editorial management of the *Industrialist* during the past as in previous years. By resolution of the Faculty I was assigned for duty to each of the six Farmers' Institutes in which the College took part during the year, which made a very considerable addition to my work of the winter.

THE FARM.

The season of 1881 has been unfavorable alike for general farming and experimental work. Of the eight years in which I have had charge of the College farm, that of 1881 has been by far the most disastrous. Indeed, the single word "failure" explains nearly all the operations of the farm, outside of the live-stock departments. The usual rotation has been practiced, with some modifications. Corn is followed by millet and oats, and these again by winter wheat, a portion of which is sowed to some of the grasses or clovers, most usually a mixture of orchard grass and red clover. Manure is applied in the spring to the corn or millet ground. During the year something near 500 two-horse loads of manure, all made upon the farm, have been hauled to the field.

The general results of the season's cropping may be briefly stated: Our wheat crop of ten acres gave a yield of 65 bushels of inferior grain; from 24 acres of corn, 295 bushels of grain were harvested; our oat crop was fairly good, 18 acres giving an average of 26 bushels to the acre, costing in production nearly 27 cents a bushel; 19 acres of millet gave a yield of 21 tons of good hay, which cost us $4.22 a ton. So much for the season of 1881.

I am glad to be able to say that the season of 1882 promises to give quite different results. We have now in the barn or standing in the field 11 acres of winter wheat, 21 of corn, 18 of oats, 17 of millet, and 10 of meadow hay, all of which will give large yields, with the single exception of corn, which will give a good average crop.

The purchase of sixteen acres north of the College farm, made by the Board during the past winter, has proved greatly to the advantage of the farm in many ways. This field, known in our records as "Field B–3," has been inclosed with a substantial fence, made of three boards and two barbed wires, with posts set every eight feet.

In respect to the general management of the farm, I desire to express the conviction, which strengthens in my mind every year, that our farm should be used chiefly for experimental and illustrative farm work, and to this end operations on the farm have been steadily shaped during the year.

STOCK.

Within the year the stock of the farm has been largely increased, both by purchase and in the natural way. By purchase, we have obtained a pure-bred imported Angus bull, bred by the noted breeder Thos. Ferguson, Kinnochtry, Scotland, and imported by Frank H. Redfield, of Batavia, N. Y.; a pure-bred Angus heifer, from the Ontario Experimental Farm, Guelph, Ont.; and a three-year-old Short-horn bull and yearling heifer, from Albert Crane, of Durham Park, Kansas. A young Jersey bull has also been purchased, from the herd of Dr. O. F. Searle, of Solomon City, Kansas. I have also purchased a work-horse to take the place of the one sold to the Horticultural Department. I have also obtained from the Nebraska State University a pure-bred Galloway cow, giving in exchange a Jersey cow of our own breeding. All the animals thus secured are of great excellence as individuals, and have proved very useful additions to the herd.

This department now owns of work stock, one span of mules, one of horses, and one saddle-horse; of neat stock, 25 head of Short-horns, 6 of Jerseys, 2 of Angus, 2 of Galloways — a total of 35 head of pure-bred cattle. Our stock of swine is limited to two breeds — Berkshire and Essex — of which we have about 30 of the former and 10 of the latter. Our stock has been almost entirely exempt from disease during the year, and at the present time is in perfect health and vigor.

BUILDINGS AND FENCES.

But few changes in the farm buildings have been made within the time covered by this report. The piggery has been removed to its present position north of the barn, where each pen is furnished with a capacious yard, which opens into yards permanently supplied with water. In the barn some improvements are needed, to which I wish to direct your attention. A scaffolding can be erected over the drive-way at the south end of the barn, at a cost of not far from $50, which would add very largely to the capacity of the barn for storing hay and grain. I respectfully request that I be given authority to go on with the work during the winter, at the convenience of the Mechanical Department.

Important work at fencing has been done. Field "B" has been inclosed with about one mile of entirely new fence. In the construction of this fence, three boards have been used from the ground upwards, and then two barbed wires, with posts every eight feet. This fence has proved very satisfactory for all the purposes of a fence. Not only will it turn young pigs, but it is an impassable barrier to the most unruly bulls. In addition to the fence just referred to, a large amount of wire fence has been constructed in odd places, he amount of which is not easily estimated.

In concluding this brief report I desire to say that only the most salient features of my work have been referred to.

A good deal of, as I think, valuable work has been done in the line of experimentation with stock, grains, grasses, and fish culture, but the details of this work have been given to the public through the columns of the *Industrialist* and the public press generally, so that it seems unnecessary that I should cover the ground in this report. I hope before the close of the year to present with your consent a full report of operations on the College farm during the current year.

FINANCIAL STATEMENT.

	Cr.	*Dr.*
To vouchers approved		$4,027 50
Valuation, June 30, 1881		7,546 00
By amount sales of stock and produce	$2,128 31	
Valuation, June 30, 1882	8,345 60	
Amount paid for permanent improvement	528 27	
Amount paid for experiments	55 55	
Amount paid for office, class, etc	41 88	
Balance	473 89	
Total	$11,573 50	$11,573 50

E. M. Shelton,
Prof. of Practical Agriculture, and Supt. of the Farm.

REPORT OF THE PROFESSOR OF CHEMISTRY AND PHYSICS, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — My class work during the year ending June 30, 1881, has been very similar to that of previous years, but a constant effort has been made to increase the work done by students. It is one thing to see experiments illustrating principles performed at the lecture table, but quite another thing to do this work themselves after all this preparation. Recognizing the importance, as expressed by Dr. Whewell, of a knowledge of things and not merely the names of things, an acquaintance with the operations and products of nature and not what has been said of them, there has been a constant increase in the work actually performed by the students. And it will be the aim to advance in this direction.

In adjusting the new course of study to the old one, classes were necessarily, at times, composed of students of two different years. This greatly increased the size of some of my classes, and gave me much more work. The classes in inorganic and organic chemistry included both the second and third-year students. They were heard in two divisions, and the usual recitation hour given to each. To the classes in mineralogy, composed of the same students, four hours were given daily, two hours to each division. One hour was devoted to the study of known minerals, aided by full descriptions and numerous specimens illustrating typical forms and all the important modifications, and to recitations upon them. During the other hours, unknown minerals were determined by blowpipe and physical characters. The enthusiasm of the students and the progress made by them repaid the severe labor of being confined to the same subject and repeating the same lesson twice each day. The class in chemical analysis did exceedingly good work. Each student worked two hours a day, for eleven weeks. The most difficult chemicals to analyze were given them for determination, and the greater portion of the class obtained a proficiency equal to my most sanguine expectations.

Below is presented a tabular view of the classes taught during the year:

Classes.	*Males.*	*Females*	*Total.*
FALL TERM.			
Meteorology	8	7	15
Inorganic chemistry	38	28	66
WINTER TERM.			
Geology	9	2	11
Organic chemistry (six weeks)	33	27	60
Mineralogy (six weeks)	40	28	68
SPRING TERM.			
Agricultural chemistry	15	....	15
Household chemistry (six weeks)	....	13	13
Analytical chemistry	20	7	27

In addition to my class work, there has been the usual analytical work for the people of the State.

The chemical department is better equipped than it has ever been before. The gas machine was placed in position a few weeks before the close of the year, but it was used a sufficient length of time to show the superiority of the gas furnished over alcohol lamps formerly used. It has given good satisfaction so far, and longer use will doubtless serve to further demonstrate its value. Other substantial improvements have been made in accordance with your directions, among which is the store room in the cellar. Although all chemicals were removed to it during the cold weather last winter, experience shows that something should be done to protect the tank also. The increased work by students in higher chemistry demands more of the apparatus used by them, such as iron lamp-stands, beaker glasses, pipettes, burettes, retorts, receivers, etc. We also need for the general laboratory an additional supply of wash bottles, mortars and test-tubes. Some lines of chemicals also need replenishing.

Respectfully submitted.
GEO. H. FAILYER,
Professor of Chemistry and Physics.

REPORT OF THE PROFESSOR OF CHEMISTRY, 1881–2.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — I have the honor to present the following report of the work of my department during the year just closed.

The classes, as far as possible, are presented in the following tabular statement.

Classes.	*Male.*	*Female.*	*Total.*	*Examined.*
FALL TERM.				
Meteorology	7	4	11	9
Inorganic chemistry	39	16	55	51
Term total			66	
WINTER TERM.				
Organic chemistry (six weeks)	32	12	44	43
Mineralogy (six weeks)	30	11	41	41
Agricultural chemistry	9	3	12	12
Term total			57	
SPRING TERM.				
Chemical analysis	22	3	25	25
Chemical physics	7	3	10	10
Geology	4	6	10	10
Household chemistry		7	7	7
Special students	3			
Term total			52	

The course pursued by these has been fully outlined in my previous reports. Greater experience and increased facilities enable me to add to the work done by the students themselves. I consider this experimental work of great value to the students, and it will be increased from time to time as I am able to do so. I request that hereafter two hours each week, instead of one, be given the class in inorganic chemistry, during the fall term, for this purpose.

Besides my class work, I have made a large number of analyses of various substances. Among these have been samples of well water, mineral water, hydraulic limestones, soil, sheep dip, &c.

A few additions have been made to the general museum, and the apparatus and appliances have been increased.

The expenditures of the department during the year have been:

Cash expended	$323 11
Department bills	78 65
Total	$401 76
The principal items of these expenditures are:	
Chemical apparatus	$122 35
Physical apparatus	21 00
Chemicals	47 10
Additions to furniture, shelving, book case, picture frames, etc	76 60
Miscellaneous supplies	25 00
Labor, including extra instruction	66 00

We need an outlay of $500 or more, to fully equip the Physical Department. All apparatus can be obtained in original packages at greatly reduced prices, by importing for the College free of duty. I ask you to consider whether we can afford to make purchases in quantities to justify the importation of supplies. Respectfully submitted.

G. H. Failyer,
Professor of Chemistry and Physics.

REPORT OF THE PROFESSOR OF ZOÖLOGY AND HORTICULTURE, AND SUPERINTENDENT OF THE GROUNDS, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — I have the honor to present the following report of operations in the Department of Botany and Zoölogy, and in the orchards and gardens, for the year closing June 30, 1881.

CLASS-ROOM WORK.

Botany.— In botany, two classes have been taught. A class of the third-year students, formed at the opening of the fall term, and including sixteen young men and fourteen young women, occupied the entire term in the study of this subject; a class of first-year students, comprising twenty young women and thirty young men, and reciting in two divisions, spent the spring term in this study, and in addition to the class-room work, each student collected and arranged a small herbarium.

HORTICULTURE.—In horticulture there were also two classes. The regular class of the second-year students, comprising six pupils of each sex, took up the study in the fall term. The instruction was given in a course of lectures, as had heretofore been the practice. In the winter term, the third-year class, to the number of twenty-five, were assigned to horticulture. With the formation of this class, I began the use of the text-book in this study, having selected "Barry's Fruit Garden," as being best adapted to this purpose. The topics presented by the text-book were enlarged upon and added to, where necessary, in a supplemental course of lectures upon special Kansas horticulture, forestry, ornamental planting and gardening. Good opportunities were given the students for acquiring a certain degree of skill in grafting, making cuttings, pruning, and other winter work.

ZOÖLOGY.—In the study of zoölogy I taught, during the winter term, a class of third and fourth-year students to the number of fifteen, using as heretofore "Orton's Comparative Zoölogy" as a text-book. The time now given to this study is one term only, instead of two as was formerly the case, and while this may be sufficient in most cases, I would suggest that an opportunity be given those desiring it for the further prosecution of this important topic.

ENTOMOLOGY.—The class in entomology comprised twenty-four students of the second year. The outline of the science and special topics of interest were presented in a series of lectures. The students were also encouraged in the study of special groups, and were given access to my private collections and library. Satisfactory work was done by the most of the class in collecting and studying insects, and sufficient interest was taken in the study.

The time allowed for the study of this science is seven weeks in the spring term, at the end of which the class is assigned to the study of anatomy under another instructor. Six students, having already studied physiology and anatomy, continued the study of entomology until the end of the spring term.

INDUSTRIAL HORTICULTURE.—I have had, during a part of the year, two students in industrial horticulture, who did, in a satisfactory manner, much work that would otherwise have demanded paid labor.

SUMMARY.

Classes.	*No.*
Botany, third-year class	30
Botany, first-year class	51
Horticulture, third-year class	25
Horticulture, second-year class	12
Zoölogy, third and fourth-year classes	15
Entomology, second-year class	25
Industrial horticulture, optional	2
Total number enrolled	159

WORK IN THE GROUNDS AND GARDENS.

Arboretum.—The arboretum has received due attention. In the spring term were planted seeds, cuttings, or plants, of about seventy-five varieties and species of trees and shrubs. The larger portion of this planting was successful, in spite of an unfavorable season.

The ground was thoroughly plowed and subsoiled before planting was done. The plants were placed in rows six feet apart, running north and south. Between these permanent rows are grown plants for removal, as they are needed in planting about the lawns.

Vacancies were left in the permanent rows for the addition of varieties likely to be obtained from time to time.

Grounds.—During the winter, a few large Austrian and Scotch pines were removed, with large masses of earth about their roots, from the upper farm, and planted in the lawn north and east of the chemical laboratory. They have in general succeeded remarkably well. A few of them injured in handling failed to survive the summer's drought, but the most are in a thrifty state, and form a prominent addition to the planting in that part of the lawn.

About twenty cedar trees were received in exchange for trees grown in the nurseries, and were planted in suitable places. A number were set in a large group near the present entrance to the grounds, and a few were planted in the vicinity of Society Hall. Deciduous trees were also planted in several localities.

The close plantations and rows of trees west and north of Mechanics' Hall have received the needed thinning, and some groups were filled out by planting additional trees.

A series of flower beds was made upon the lawn, and planted with a variety of verbenas, geraniums, lantanas, coleus, and other bedding plants, taken principally from the greenhouse at the College. These did well.

Orchard.—A portion of the north orchard, containing old trees, was seeded to orchard grass. The remainder was kept in cultivation with harrow, cultivator and hoe, until midsummer.

The work of top grafting the trees in the north block was carried on as far as practicable. This work was done under my personal direction, by students in the class in horticulture. The following varieties were thus added to the collection: Gramar's Pearmain, Scarlet Perfume, Grimes's Golden, Franklin's Golden Pippin, and Northern Spy.

Some two-year-old plum trees of the Wild Goose, Miner, Lombard and Coe's Golden Drop varieties were planted in vacancies in the south orchard. Several thousand apple grafts, made by students, were planted and grown.

Vineyard.—The collection of grapes has been increased by the purchase of the following varieties: Amber, Creveling, Cynthiana, Beauty, Black Eagle, Grein's Golden, Essex, Salem, Elvira, Iona, Martha, Missouri, Riesling, Lindley, Pearl, Rulander, Telegraph, and Uhland; and by the following received in exchange: Brighton, Catawba, Ives, Moore's Early, Lady

Perkins—a total of twenty-three varieties. Cuttings were grown of the four additional—Goethe, Cottage, Herbemont and North Carolina, and these will also be planted in the vineyard.

A large number of cuttings of vigorously growing varieties, including Concord, Clinton, Dracut Amber and Taylor, were grown with the intention of using them the coming season as stocks upon which to work those varieties subject to the phylloxera.

Some yearling peach trees were cut back and budded the following (last) fall with fifty varieties of peaches. Trees of some of these will be planted in the south block of the orchard.

Six or seven varieties of strawberries, represented by fifty of each variety, the gift of Mr. C. E. Wilcox, of Wyandotte, have been added to the sample-beds of that fruit.

GREENHOUSE.— In the fall of 1880, a small structure, 13x24 feet, to be used as a propagating pit or greenhouse, was built in the southeast angle of the horticultural hall. It is heated by a small brick furnace, with flue passing under the benches and connecting with the east chimney on the building. This structure has been utilized for greenhouse purposes, and now contains a good variety of plants, chiefly propagated from cuttings or seed, a few being purchased, and some presented by friends of the enterprise.

The most important donation was made by Prof. S. M. Tracy, of the Missouri University, and comprised many interesting and rare plants. Other plants of value have been presented by Mrs. A. Griffin, and Mr. T. C. Wells, of Manhattan.

THE MUSEUM.

Considerable progress has been made in the formation of a museum of zoology, and botany. Since my last report, cases for the preservation of entomological, botanical and zoölogical specimens have been completed and added to the furniture of the room.

The donations to the botanical museum comprise: 149 wood specimens of North-American trees and shrubs, received from Prof. S. C. Sargent, of the Forestry Department of the United States Census Bureau; a valuable collection of herbarium specimens representative of North-American and European plants, from Dr. Geo. Vassey, Botanist for the United States Department of Agriculture; several specimens of rare local plants, presented by Messrs. C. S. Pence and M. Skinner, of the botany class. To the zoölogical museum have been added: A valuable collection of alcoholic specimens of marine animals, presented by Frank W. Cragin, of Boston, Mass.; by collection, about seventy-five specimens of reptiles and fishes, collected by the curator, and by the members of the Scientific Club of the College; by purchase, a small collection of mounted birds.

These additions have been incorporated with the collections already on hand, and arranged so far as possible in the cases prepared for them.

All of which is respectfully submitted. E. A. POPENOE,

Professor of Botany and Zoölogy, Superintendent of the Orchards and Gardens, and Curator of the General Museum.

REPORT OF THE PROFESSOR OF HORTICULTURE AND BOTANY, 1881-82.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—I have the honor to present the following report of the class-room work in the Department of Botany and Zoölogy, the operations in the orchards and gardens, and the state of the general museum in my charge, for the year ending June 30, 1882.

In the class room, the work has been slightly modified by the new course of study, only now fairly entered upon. The variations from the work of former years, however, are all in the line of progress, and will be noted in the account of the classes, as given below.

BOTANY.—In botany, two classes have been taught. In the spring term, the first-year students, fifty-nine in number, reciting in two divisions, studied the gross anatomy of plants and elementary plant physiology, by the aid of Gray's Manual and Lessons in Botany. About ten lessons were devoted to the study of the system of classification, and each student collected and arranged a set of fifty species of plants.

During the same term, the fourth-year students, eight in number, formed a class for the study of higher botany, with the aid of the microscope. Bessey's Botany was here used as a text-book. The studies of the term covered about one-half of the work used as a guide, embracing the general consideration of all structures and tissues, plant movements, and similar topics, followed by the study of the more generalized types of plants. In addition to this, the regular class work, each student chose some special topic in the general line of study for his individual work, studied it as fully as the time and materials would allow, and presented the result of his observations, at the close of the term, in a paper upon that topic.

This work was of great value to the students. The only regret is that their opportunities were limited to one hour per week, as the two microscopes available did duty for the class of eight. There is great need for additional instruments, in order that each student may be given the daily use of one.

I would earnestly recommend an appropriation for the purchase of at least five additional instruments, to cost about $25 or $30 each. These instruments are quite as seriously needed in the class work in zoölogy also.

HORTICULTURE.—The second-year students, forming a class of 30, met daily during the fall term for the study of horticulture. As during the last year, the text-book, Barry's Fruit Garden, was supplemented by lectures upon special topics insufficiently treated in the text-book. The students of this class were all familiarized with the practice of grafting, making cuttings, and, in the case of the gentlemen, with pruning and such other work as the season permitted.

During the year twelve different students were assigned to me for instruction in industrial horticulture, and were given employment in all possible lines, in the orchard and nursery and about the lawns, under the supervision of the foreman. They were paid for any work not strictly instructive, and of direct value to the College.

Zoölogy.— The students of the fourth year, 11 in number, met daily during the winter term for the study of zoölogy, using Packard's Zoölogy as a text-book. While our facilities in the study of this science are less ample than in botany, we still made good use of our means of illustration. Our advantages in this respect are increasing with the growth of the museum, but we need a small collection of typical marine invertebrates, a few of which, however, have been recently added by donation or exchange.

Entomology.— The second-year students formed a class of 32, during the first seven weeks of the spring term, for the study of entomology. The instruction, as heretofore, was comprised in a course of daily lectures, embodying the principles of classification, the description of the most prominent families of injurious or beneficial insects, accounts of their habits, and the application of these facts to economic entomology. Each student made a classified collection of insects.

In addition to the above classes regularly belonging to my department, I taught a class of first-year students in geography, during the winter term. This class numbered forty-two students.

I have also had charge of the second-year students, in rhetorical exercises, having met them each alternate Friday afternoon, for drill in reading, recitation, and composition. Forty-eight students were enrolled in this class.

SUMMARY OF CLASSES.

Classes.	*Female.*	*Male.*	*Total.*
Botany, elementary	21	38	59
Botany, advanced	5	3	8
Horticulture	6	24	30
Horticulture, Industrial	....	12	12
Zoölogy	5	6	11
Entomology	10	22	32
Geography	11	31	42
Rhetoricals	17	31	48
Totals	75	167	242

The Lawns.— During the spring, the shelter-belt back of the College building was extended several rods towards the south by the planting of trees brought from the plantations on the upper College farm — principally elms, ashes, box elders, and catalpas.

On the slope, in front and to the left of the main College building, were planted several larger groups of trees and shrubs, according to the proposed extension of the lawn and the arrangement of the main drive.

A belt of elms, cottonwoods, and walnuts was planted along the east front from the old to the new entrance. All these plantings are doing well, and receive due care in cultivation.

In the nursery several hundred catalpas of four species have been grown, several hundreds of the sycamore, ash, elm, hackberry, box elder, maple and other trees are being grown, and will in another season, be ready for planting in permanent places on the lawn or about the farm where needed. There are also in good growth, a few choice and rare trees, among which are some tulip poplars, English elm, Siberian pea tree, Japan sophora, and others, all of which are at present showing well, and may be available in our lawn planting.

A large number of hardy ornamental shrubs already well tested here have been propagated, and are now nearly ready for transplanting to places where they are required. So far as has been profitable or possible, the propagation of these shrubs and trees has been done on the grounds, furnishing employment to the classes in industrial horticulture.

A few species have been added to the arboretum during the past spring, some by the planting of seed, others by the purchase of young plants.

ORCHARD WORK.—The orchards are now in better condition than ever before, the trees being in good health and mostly well shaped. The work of introducing additional varieties has progressed as rapidly as the pressure of other work would allow. As fast as the trees come into bearing the orchard records are verified, or corrected, as is quite often necessary, and we now lack but little of knowing the name of each variety in the orchards.

Two-year-old trees of thirty varieties of peaches, propagated and grown in our nurseries, were planted in the south orchard in vacancies left by the removal of blighted pear trees. These peach trees have made a fine, thrifty growth so far, and promise to become, with the additions that will be made from time to time, a valuable accession to our means of illustration. As many of the varieties are new or little known, the planting is of considerable experimental value also.

There have been propagated and planted several varieties of plums, chiefly the hardy native varieties; these will be finally set in the orchard near the peaches.

No additions to our list of grapes have been made during the past season.

THE NURSERY.— Several thousand root grafts of the apple, the work of the students, were planted in the spring of the present year, and a good stand secured. These grafts are of standard and readily salable varieties. The cuttings of grapes and of ornamental shrubs and trees, made by the students in horticulture, were also planted.

The propagating house has served remarkably well for its size, and has been a constant attraction to visitors, as well as an important means of illustration in my classes, and of furnishing bedding plants for the lawns.

A valuable collection of greenhouse plants was received during the spring from Hon. John A. Anderson, comprising many quite showy and choice sorts, and has added much to the interest in our small house. It is to be hoped that early provision will be made for the erection of a suitable greenhouse, an addition much needed, and capable of being made a source of actual profit.

State of the Museum.—The conchological collection of Prof. J. S. Whitman, so long on deposit in the museum, was purchased by the Board of Regents, and forms the most considerable addition of the year. When the specimens are properly determined, labeled and arranged in cases, they will be attractive and valuable. At present, however, owing to the fact that the specimens are not labeled, it is not possible to form more than an approximate idea of the value of the collection. It includes marine, land and fresh-water shells.

The collection of alcoholic specimens has been considerably increased by the efforts of students and others connected with the institution, and has now outgrown our means of accommodation. Additional museum jars will be provided, and the whole collection properly displayed, as soon as possible. Our representation of the reptiles of this locality is now quite full and valuable. The fishes also are being collected as fast as opportunity offers.

The herbarium has been enlarged by the collection of the plants of this vicinity not heretofore represented, and also by the collections of the curator, made during the summer of 1881 in Colorado and New Mexico. These additions, though not large, are of much interest and value.

A few handsome accessions to the ornithological collection are the result of an exchange with Dr. Blachly, of Manhattan.

The appropriation secured by the Board has been nearly expended, and a range of wall cases has been placed about the north, west and south sides of the museum, giving much-needed room for the display of the collections now on hand and for the reception of others.

The following statement of the finances of my department will indicate approximately the direction of the outlay:

Total cash expenditure, per vouchers, is	$1,710 91
In department bills	369 42
Total	$2,080 33
This total is charged as follows:	
Grounds	$215 96
Nursery	255 05
Fruit plantations	221 95
Tools and buildings	181 90
Team	217 50
Greenhouse	132 30
Class-room appliances	142 64
Museum and cases	679 43
Office materials	5 40
Freight and expressage	28 20
I have the Treasurer's receipts for cash paid him on the department account for	$153 05
Department bills in my favor	63 10
Increase in inventory	1,201 05
Total credits	$1,417 10

Respectfully submitted. E. A. Popenoe.

REPORT OF THE PROFESSOR OF ELEMENTARY ENGLISH AND MATHEMATICS, 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Allow me to submit the following report of the Department of Elementary English and Mathematics, for the year ending June 30, 1881:

I have taught during the year classes in English, arithmetic, book-keeping, and United States history. The "B" class studied, during the first term of the year, all of the elements of the simple sentence, and had much practice in the analysis of all kinds of simple sentences, together with the capitalization and punctuation of the same. Considerable time this term was spent on the matter of penmanship. I used the Spencerian chart, recently purchased by this department, with very satisfactory results. The class also received a considerable drill in the elementary sounds of the language.

The attention of the class during the second term was directed, as far as science of language is concerned, to the discussion of the complex and the compound sentence. A thorough analysis of all the different kinds of these sentences was given, and the pupils were led to consider the thought of a sentence, and why such language was used to express it. Punctuation continued.

The study of the third term was given chiefly to the modifications of all the parts of speech; especially to the cases of nouns and pronouns, the principal parts of the irregular verb and their use, the agreement of the verb with its subject, and of the pronoun with its antecedent. Many examples of incorrect construction were given the class, and they were always required to give the reason for the correction. No time has been spent on what is usually termed parsing, but throughout the entire year, and particularly during the second and third terms, about two lessons a week have been spent on the written expression of the pupils' own thoughts.

It has been my constant effort to lead out the thoughts of each student on any subject within his capacity, and to induce him to express those thoughts easily, clearly, and in conformity with good usage. Sometimes topics have been assigned in the class room, and the students allowed twelve or fifteen minutes to write their thoughts upon them. At other times, the topic would be assigned the previous lesson, and the class required to bring in the expression of their thoughts with pen and ink. The most laborious part of all my work is the criticism of these written productions. I secure all the assistance in this line that is practicable from the class itself, but still there remains much for the instructor to do. Less time was given to the matter of orthography, except in the criticism of essays, than in some previous years, and at the last examination I notice many examples of miserable spelling.

How this matter, which should have been learned in childhood, is now to be corrected in the time we can afford to give it, I do not know. Perhaps a reform in English spelling will relieve us. The number in this class during the year has been about sixty.

Arithmetic was taught only during the fall and winter terms. Class "A" is allowed but one term to review and complete arithmetic. This class was larger than usual last fall, numbering about seventy, and was taught in two divisions. The class considered the subject of percentage in all its bearings, including profit and loss, commission, stocks, insurance, taxes, duties, interest, discount, banking and exchange; also equation of payments, partnership, ratio, proportion, allegation, square and cube roots, and a part of mensuration. Class "B" was confined mainly to common fractions, decimals, and compound numbers. They receive much drill, to secure accuracy and a reasonable degree of speed in the performance of work under the fundamental rules. In the second term of the year, this class investigate many of the same subjects studied by the advanced class during the previous term. As this is nearly or quite new ground to a majority of this class, they are expected to review it the following year.

It has been my object to so teach arithmetic as to give the student power to apply his knowledge to any actual business transaction. Much practical work outside the text-book is required. I have endeavored to explain the reason of all the principles used, so that the student might first know how; second, why; and third, secure skill in the mechanical performance of the work.

Class "A" took book-keeping during the winter term, and class "B" during the spring term. The classes have made out full sets of books, both in single and double entry, from memoranda prepared by myself. It has been my effort to acquaint them both with the principles and practice of book-keeping, to show them the kind of book-keeping best adapted to different kinds of business, and to impress upon them the advantage to every one of keeping books in some way.

The "A" class also pursued the study of U. S. history during the winter term, and the "B" class during the spring term. I have allowed my classes this year a little larger liberty in the discussion of many of the topics of history than I ever did before. This has in some respects increased the interest of the class in the study. I have encouraged them to examine as many authors upon a given subject as were within their reach, and the result has been that a large number of histories and several cyclopedias have been frequently quoted in the class. The large map of the United States purchased by this department some time since has been very useful in fixing the location of places referred to in history in the minds of students, many of whom have but a limited knowledge of geography.

Besides these classes, the "A" class in English has been under my instruction in elocution each alternate Friday afternoon during the year.

I have also continued to teach vocal music to those desiring such instruction, giving each of two classes two lessons per week, in the afternoon, for which I have charged them at the rate of one dollar per term. The average number in each of these classes during the year was about thirty. I wish to call the attention of the Board to the fact, that while in the year previous the "B" class in the first year was larger than the "A" class, in this last year the "A" class was considerably larger than the "B" class, showing a little progress, at least, toward the advanced standing taken by our present curriculum. Some of my classes during the year have been larger than conduced to the best progress of the students. The result of my experience is, that when a class exceeds forty in number, it cannot be handled with as good results as if it contained a less number.

A tabulated view of my classes during the year is as follows:

Classes.	*Enrolled.*	*Examined at close.*
FALL TERM.		
Arithmetic, "A," (two divisions)	73	62
Arithmetic, "B," (one division)	62	56
English, "B," (one division)	68	63
WINTER TERM.		
Arithmetic, "B," (two divisions)	88	75
English, "B," (one division)	69	61
Book-keeping, "A," (one division)	63	56
U. S. History, "A," (one division)	61	51
SPRING TERM.		
English, "B," (two divisions)	58	47
Book-keeping, "B," (one division)	52	44
U. S. History, "B," (one division)	38	29

Respectfully submitted. J. E. Platt,
Professor of Elementary English and Mathematics.

REPORT OF THE PROFESSOR OF ELEMENTARY ENGLISH AND MATHEMATICS, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Permit me to submit the following report of the work done in my room during the year closing June 30, 1882.

I have taught classes in arithmetic, English, book-keeping, and geography. Owing to the large number of students in the first year, I was unable to teach the class in United States history, as I had done for several years previously, and this work was performed by other members of the Faculty. Professor Graham also kindly assisted in the teaching of arithmetic, during the winter term.

As I have repeatedly set before the Board my views and methods in reference to the various branches of study in my department, I have nothing specially new to offer upon that subject; but would only remark, that it has been my constant effort in teaching arithmetic and book-keeping, to bring these subjects as near to actual business transactions as possible, and in teaching English, to so intermingle practice in the expression of thought upon paper, and the theory of grammar, as to give the students facility in the use of language and at the same time the ability to know why a certain thought was or was not correctly expressed.

The new relief globe purchased by the College has been called into requisition frequently in teaching geography, and has been found very useful. The lessons in this study are accompanied by frequent exercises in map-drawing.

I had charge of a class of about sixty members of the first year, in elocution, meeting them on alternate Friday afternoons.

I have also taught vocal music in two classes, meeting each class twice each week. These classes have numbered from fifty to eighty students, from whom I have received an average fee of one dollar each term.

The following statement shows the classes in my charge each term, with the students in each:

Classes.	*Enrolled during term.*	*Examined at close.*
FALL TERM.		
Arithmetic, "A," (two divisions)	117	106
Arithmetic, "B"	58	53
English, "B"	70	64
WINTER TERM.		
Arithmetic	44	39
Book-keeping (two divisions)	93	70
English (two divisions)	82	63
SPRING TERM.		
Geography	31	30
Book-keeping	52	50
English (two divisions)	55	53

Respectfully submitted. J. E. Platt.

REPORT OF THE PROFESSOR OF MILITARY SCIENCE AND TACTICS, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — I have the honor to submit the following report for the College year ending June 30, 1882.

I was assigned to duty as Professor of Military Science and Tactics by orders from the War Department dated August 1, 1881. I reported for duty to the President of the College by letter on the 3d of August, and in person about the 1st of September.

Classes were organized for drill about a week after the beginning of the fall term, and have been continued through the year. During the fall and winter terms the drills were usually three times a week, and in the spring term twice a week, the length of each drill being about forty-five minutes.

The chair of Military Science having been vacant for over ten years, it was necessary to commence at the very beginning.

During the year the following drills have been practiced: The School of the Soldier, comprising setting up exercises, principles of marching, etc.; the School of the Company; the Manual of Arms; the Bayonet Exercise; the Skirmish Drill; the Battalion Drill.

No arms were received from the Government until about the 1st of May, and up to that time the drill in the manual of arms was practiced under difficulties. About a dozen old muskets of several different patterns were collected, and were used by the students in turn.

The arms received from the United States Government consist of seventy-five breech-loading cadet rifles, calibre .45, latest pattern, and the necessary accoutrements and spare parts for repairs.

Four non-commissioned officers' swords have been purchased by the authority of the Board. Cases for one hundred guns have been built by the Mechanical Department.

Several of the older and better-drilled students have been appointed to act as non-commissioned officers at different times during the year. The progress made in drill I consider very fair. In inclement weather, drills have been held in the old Societies' Hall, now known as the Armory Hall. The room available is much too small, and I would respectfully recommend that as soon as practicable measures be taken to enlarge the drill room by tearing out partitions.

A small class in military science was organized in October, and has been continued through the year, reciting twice a week during the fall and winter terms, and three times a week during the spring term. During the winter and spring terms, one lecture each week on a military subject was delivered to this class. The class has made very good progress.

In addition to the work above mentioned, I have taken some classes in other departments: In the fall term, a third-year class in general history and a first-year class in English; in the winter term, a third-year class in rhetoric and a first-year class in United States history; and in the spring term, the same third-year class in English literature. I have also had charge of a first-year class in rhetorical exercises during the entire year, and of a small class of young ladies in calisthenics during a part of the spring term.

A tabular statement is here given of the number of students in each class in the different terms:

TERM.	DRILL.		MIL. SCIENCE.		GEN. HISTO'Y.		RHETORIC.		ENG. LITER.		ENGLISH.		U.S. HISTORY.		RHET. EXERC'S.		CALISTHENICS	
	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...	Began...	Compl...
Fall	95	85	8	8	23	20	......	......	......	......	43	38	......	......	42	40	......	......
Winter	74	55	8	6	......	......	18	18	......	......	......	......	40	30	48	34	......	......
Spring	33	29	2	2	......	......	......	......	9	8	......	......	......	......	24	23	20	18
During year	109		9		....		....		....		....		....		60		....	

In the number "during year" only the number of different students is set down. In the winter term all second-year students in drill were obliged to leave the class at the middle of the term on account of an extra hour in chemistry. This accounts for the largely diminished number of those finishing the term. In the class in military science all but two left college in the spring term.

I am, very respectfully, your obedient servant,

Albert Todd,

1st Lieut. 1st U. S. Artillery, Prof. of Military Science and Tactics.

REPORT OF THE PROFESSOR OF INDUSTRIAL DRAWING, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Allow me to submit the following report of the Department of Industrial Drawing for the collegiate year of 1880–81.

The number of students enrolled during the first term was 142, during the second term 127, and during the third term 93. Four or five classes were taught each day. The plan of instruction in primary work followed was the same as that of last year, based upon the system of Prof. Walter Smith, Art Director of Massachusetts. Of the students enrolled in my classes the greater number were beginners, receiving primary instruction in the use of measuring and drawing tools, in geometrical construction and freehand drawing from the flat. During the winter term a class of 42 students studied linear perspective and orthographical projection, by lectures given on alternate days. A great deal of interest was manifested in these subjects, and the drawings completed by this class, consisting of colored projections and perspectives of simple solids, were usually clear and correct. During the spring term the class in surveying made a set of topographical plans under my supervision.

About one-fifth of my pupils studied advanced free-hand or architectural drawing. Each worked independently from the rest, according to his needs, taste and standing. The work of these advanced special students, consisting of twenty-six large plates in architectural drawing, nine plates in plain and ornamental lettering, thirty-six plates in model and object drawing, twenty-nine copies from lithographs and woodcuts, and a few original designs, were on exhibition on the walls and tables of my class room during commencement week, and were undoubtedly seen by you. Most of these drawings were executed in India ink and colors, and many of them were quite commendable.

A great obstacle to the satisfactory advancement of many of my pupils is their utter want of taste — a sense for the beautiful. Most of them come here from the rural districts, where too little attention is given to order, harmony, and ornament. They do not feel the beauty of repetition, symmetry and proportion in a design or an object, and have no appreciation for tangential connections and gradual curvature in lines. Many are unable to feel the difference between the outlines of a classic vase and a fence post. That such freshmen should question the wisdom of putting drawing in a curriculum designed for farmers and mechanics, is natural; and that their progress must at first be slow, is certain. It often takes a year or two of very hard work on the part of the teacher to make them the enthusiastic students of form and color which the pupils of city schools generally are. A large and attractive class-room, painted in polychrome and ornamented with casts and pictures, would be a great help in the development of such pupils. I hope the Board will be able to provide the department with these means during the present year.

The department is greatly in need of some additional models, tools, and cases for storing away books of reference, casts, etc. If the financial condition of the College does not permit the expenditure of a large amount, I respectfully request that an appropriation of at least sixty dollars be made for this purpose. Respectfully submitted.

J. D. Walters,
Instructor in Industrial Drawing.

REPORT OF THE PROFESSOR OF INDUSTRIAL DRAWING, 1881–82.

To the Board of Regents of the Kansas State Agricultural College.

Gentlemen — Allow me to submit the following report of the Department of Industrial Drawing, for the collegiate year of 1881–82.

The number of students enrolled for daily instruction in my department has ranged between forty-five and one hundred and forty-one. Five classes have been taught daily, a short period during the winter term excepted. In the first-year classes, Prof. Walter Smith's text-books were used, the students completing during the fall term four books in geometrical drawing, and during the half-term given to drawing in the spring, the third, fourth and fifth books of free-hand drawing. Besides this elementary work, most students made a number of free-hand sketches from plants in the flat. Twelve of these first-year students had the opportunity to take drawing through the winter term also, and five remained in my department during the whole school year. These were given a course in object drawing from nature, using to start Walter Smith's third book of the intermediate course, and a course in copying simple architectural ornaments, as borders, brackets, rosettes, Greek and Roman capitals, etc. No attempts were made at shading in this work.

The second-year students were assigned to drawing during half of the spring term. This class received a course of lectures on orthographical projection and linear perspective. To facilitate the study of these subjects, I prepared a synopsis of the lectures, and had copies printed at the Printing Department, and distributed them to the class. Supt. Thompson, by kindly doing the most of the work himself, reduced the cost to ten cents a copy. After instructing the class in the use of the drawing board, the T square, India ink, and water color, each student was requested to draw two plates 17x22 inches, representing a collection of geometrical solids in projection and perspective. These plates, executed in ink and color, were on exhibition in my class-room during commencement, and were undoubtedly noticed by the Board.

The male students of the third year received a course of lectures on shades, shadows and advanced projection. This class, having had courses in civil engineering and mechanics, did some very creditable work, and strikingly proved to me the wisdom of adding more mathematics to the curriculum. Among the problems solved by this class was the projection of the conic sections, the projection of the cylindric and conic screw line, shadows of the intersected cone and sphere in various positions, etc.

According to our rules, students who show special aptitude in this direction are permitted to take drawing during the whole collegiate course. Quite a number of students availed themselves of this opportunity during the past year, male students studying architectural and female students object drawing or designing, and in a few cases, sepia painting.

During the year, the department, through the kindness of the Board, has added to its tools and collections several volumes of drawing studies, a set of simple vases and solids, four specimens of majolica and glass ware, a large screw, and three cast-iron wheels. These articles have been of great value in the work of the year; but, with the growth of the classes, and the increasing number of students who wish to pursue drawing as an extra study during the third and fourth years of the course, a great many additional tools, models, casts and lithographs will be almost absolutely necessary during the coming year. I respectfully request that an appropriation of $300 be secured for this purpose, if possible. Respectfully submitted.

J. D. WALTERS,
Instructor in Industrial Drawing.

REPORT OF THE SUPERINTENDENT OF TELEGRAPHY, 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—During the year ending June 30, 1881, the Telegraph Department enrolled 75 pupils—46 gentlemen and 29 ladies. These students were instructed in all that pertains to a thorough understanding of all the theoretical, practical and technical branches of the art, as far as the time would allow. It is not possible for the student, coming here, as he does, with no knowledge of electricity, or of the one art to which this science is most commonly applied, to acquire a comprehensive knowledge of this subject in so short a time as one year. To become a good electrician requires many years of hard study, and the time necessary to become a good operator is not much less—as an operator, if he be eminently successful, must be more or less of an electrician. The simple knowledge of how to manipulate a telegraph instrument is not the only thing necessary to an operator. He may obtain enough of this knowledge in a comparatively few months to enable him to earn a salary; but unless he study his trade, his prospects of rising to eminence in his chosen profession are poor.

Our object is, and can only be, to give the student a good elementary knowledge of the several arts as here taught while he is obtaining a general education. The success of this department in this direction is made evident by the fact that fifteen young ladies and gentlemen who have been students in this department in the past two years are now working as operators, at salaries varying from $35 per month for the boy of sixteen, to $90 per month for the young man of twenty-four years. That some of these young people do their work well, is proved by the following remark, made by the superintendent of one of the most prominent telegraph lines of the State: "Those of your students who are working on our line are among the best operators we have."

The financial condition of the department for the past year is shown by the following:

STATEMENT.

	Dr.	*Cr.*
Inventory, June 30, 1880	$257 25	
To new telegraph poles	66 00	
Reference book	5 00	
Instruments, bells, wire, etc	55 34	
Students pay roll	50 53	
Sulphate of copper	22 40	
Zinc	6 85	
Bills of other departments	21 95	
Freight and incidentals	9 55	
Balance	87 62	
CREDITS.		
By cash received as fees		$200 24
Inventory, June 30, 1881		382 25
Totals	$582 49	$582 49

The department is improving, both in means and methods.

Respectfully submitted. I. D. GRAHAM,
Superintendent of the Telegraph Department.

REPORT OF THE TELEGRAPH DEPARTMENT, 1881.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — The Telegraph Department has enrolled during the past year 78 students — 24 ladies and 54 gentlemen, being an increase of three over the enrollment of the previous year.

These students have been taught the telegraph business in its several branches, the management of the instruments used, a knowledge of the battery, its plant and maintenance, line building and repairing, and the necessary book-keeping. In addition to this they were taught, by means of lectures (the department having no text-book), as much of the underlying science of electricity as was absolutely necessary to a correct understanding of the business.

The department has always experienced some difficulty in the training of its students, owing to the fact that many of them have no knowledge of physics, and are not yet of sufficient advancement in the course to study it. That some knowledge of electricity is necessary to the operator will not be questioned, and the constantly increasing number of uses to which it is being put in the management of the railroads of the country, with its other uses, makes the necessity of the knowledge more apparent. For these reasons it has been thought best to adopt a text-book for use in the department.

That our students succeed well in this business, is shown by the fact that they are now employed on many of the lines of the country, as far distant as Michigan and Old Mexico; most of them, however, are in Kansas, Colorado and Missouri. This is also shown by the fact that we receive inquiries from the superintendents of the telegraph lines of the State for operators.

During the past year the growth of the department has made necessary some additions to the line and to the office furniture, and the arrangement of classes in the several buildings has made necessary an increase in the electric-bell system for the general College.

In accordance with the action of the Board at the October meeting, the line was extended to and a short distance beyond the old boarding-hall, for the accommodation of a number of students who live in that neighborhood.

Besides the cash expenditures, the department has had some work done by the Printing Department, that had been authorized by the Board, as also some work done and materials furnished by the Mechanical Department.

The financial condition of the department is shown by the following statement of receipts and expenditures:

RECEIPTS.	*Dr.*	*Cr.*
By cash received as fees		$291 45
Increase in inventory		261 25
Total		$552 70
EXPENDITURES.		
To new telegraph poles	$13 80	
Line	50 77	
Instruments	37 72	
Battery	58 73	
Tools	6 90	
Bells	4 60	
Type writer	75 00	
Students' labor	50 35	
Incidentals, (tacks, copper, etc.)	9 15	
Freight and drayage	23 05	
Total		330 07
Balance		$222 63

In addition to my work as Superintendent of the Telegraph Department, my other duties have been as follows:

A class in arithmetic, numbering forty-nine students of the "B" division of the first-year class, which I had in charge during the winter term, the overcrowded condition of the "B" class making it necessary to divide it, and one-half was assigned to myself as teacher; the chapel roll, on which the absentees of each morning were noted and reported to the President; a regular monthly share in the editorial work of the *Industrialist;* the keeping of the grade register, in which the grades of each student are entered at each examination; the Faculty records; and other work in the office of the Secretary of the Board. The electric-bell system, by which the movements of the classes in all departments are controlled, is in my charge.

The Telegraph Department is in good working order. The students manifest a good degree of enthusiasm in its work, and show a commendable zeal in seeking to know all there is to be known in regard to the science of electricity, as well as the art of telegraphy. Respectfully submitted.

I. D. GRAHAM, *Superintendent.*

REPORT OF THE PRINTING DEPARTMENT FROM JULY 1, 1880, TO SEPTEMBER 30, 1881.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — The following report from the Printing Department covers a period beginning with the College year, July 1st, 1880, and closing Sept. 30th, 1881. It is made to include fifteen months, because my connection with the College ceased at that time. In making this eighth and last annual report, it may not be improper for me to review the work of the past years.

The Printing Department was established in the winter of 1873. In April, 1874, when I took charge, it was located in the rear of the chapel room of the old College building, and consisted of one proof press and twenty-five pairs of cases of long primer type. The fifty or sixty students then enrolled in two divisions spent one hour each day at those cases in unsystematic drill. We soon were given more comfortable quarters; and in April, 1875, by the purchase of a half-medium Gordon press and more type, our facilities were so improved that we began the publication of the weekly *Industrialist*, a three-column folio, 10x15 inches in size. There were months of plans and experiments, with efforts at some sort of system in our work.

In October, 1877, the paper was enlarged to four columns — its present size — 15x21 inches. As a college sheet, the work of students, it has always been admired. During the seven years of its existence it has visited regularly all the State officers, legislators, county superintendents, and newspapers in the State.

Probably no paper in Kansas has as able a corps of writers, and certainly none goes regularly to as many of her prominent and influential men. All College correspondents have received the paper a greater or less length of time, and it has often proved a valuable supplement to the annual catalogue, giving more recent information than that contained.

Its average circulation has been about 1,000 copies, but as many as 5,000 have been printed for several consecutive issues. I would be glad, had I the data, to show you the annual cost of the *Industrialist*. You would be surprised to find how little this valuable advertising medium has cost, all things considered. I respectfully refer you to the books of the College for this information, with the request that for the benefit of the department and the paper, it be presented at your present meeting.

Since the establishment of the department, it has done as much of the job printing of the College as its facilities would admit. Every year these have increased, until now the department is prepared to do nearly all the work required.

In 1874 the value of the material on hand was about $225. The last inventory, June 30, 1881, showed a total of $1,331.08.

So far I have said nothing about the class-room work — its growth and results. From the first the object has been rather to give to the many the principles of printing, with thorough drill in spelling, punctuation, capitalization, syllabication, and composition, than to make printers of a few. Each incoming class has contained a few who showed special aptness, and these have been encouraged to continue. Besides those who have made printing a specialty, there are many who have learned enough to do very satisfactory work. A number of my former pupils now hold positions in this and other States, and I refer to my worthy successor as proof of the kind of work the department has been doing.

In deciding upon a course of instruction, we had to be guided much by experience, for there are no suitable text-books on printing. With the American Printer, Harpel's Typograph, Wilson's Punctuation, and Ringwalt's Encyclopedia of Printing, as books of reference, such a line of instruction was followed as seemed best to accomplish the object in view For a brief statement of the two courses pursued, you are referred to the catalogue. These are but an outline, which in the future will doubtless be modified and amended as experience may suggest.

During the past year the department has grown more than in any previous one. There has been a marked improvement in some of the methods of teaching, and a gratifying increase in the facilities of the office. Some useless type has been replaced by new fonts, which were especially needed. Another and excellent imposing stone has been added, new cases purchased, and many little conveniences distributed through the room. While the classes have not been as large as in the past years, they have been large enough for healthy and rapid improvement, and have contained a better grade of students than heretofore.

I am glad to say, at the end of the year, that I think the department is in a good condition, and well equipped for work now expected of it. I know you will from time to time add to its facilities, as you draw more largely upon its resources.

In leaving the College, let me say that I do so reluctantly, realizing that I have been a learner as well as a teacher.

Accept my gratitude for courtesies extended and leniencies shown. I shall always feel a deep interest, not only in the growth and permanence of the Printing Department, but in the general and lasting prosperity of the College. Respectfully submitted. A. A. STEWART,

Ex-Superintendent of the Printing Department.

REPORT OF THE PRINTING DEPARTMENT, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Allow me to present herewith a report of the Printing Department from October 1, 1881, to June 30, 1882.

On taking charge of the department, about one month after the opening of the fall term, I found it in a good condition, and the classes well organized. As many of the students enter the department for the benefit of the drill in punctuation, Wilson's Treatise on Punctuation was immediately introduced as a text-book, and was found to be an improvement over the printed slips which had been used. No change has been made in the system of teaching.

Fifty-two students were enrolled in the department during the year. The considerable amount of work done for the College enabled the advanced students to have drill in plain job work. During the fall term, a catalogue of 200 copies of the College herd of cattle was printed for the Farm Department. In the spring term, a pamphlet of 100 copies was printed for the Drawing Department; also an edition of 4,000 copies of the annual catalogue of the College. The addition to the office of two new fonts of body type, and of a Franklin paper cutter, greatly facilitates its work.

The following is the financial statement of the year:

Cash expenditures	$1,072 95
Department bills against the Printing Department	34 56
Total	$1,107 51
RECEIPTS.	
Cash	$301 65
Department bills	361 35
Total	$663 00

The *Industrialist*, and the additions to the department, form the greater part of the expenditure Respectfully submitted.

Geo. F. Thompson, *Acting Superintendent.*

REPORT OF THE SUPERINTENDENT OF WORKSHOPS, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—I herewith submit the following report for the Mechanical Department, for the year ending June 30, 1881.

The whole number of students enrolled in the department during the year has been one hundred and seventy. Of these, four have been young ladies, at scroll sawing; all others were young men enrolled as carpenters. The course of instruction has been substantially the same as in former years — to give as much skill as possible in the use and care of tools, the best method of dressing out stock, and making the various joints that come in the course of the carpenters' and cabinetmakers' trade, each student to be advanced as fast as his skill would warrant. In addition to teaching the classes, a large amount of work has been done by the department for the other departments of the College, in all of which students have been employed as much as possible, and quite a number have done good work. An allowance of about fifty dollars will be needed to keep the stock of tools up to the present condition, and add a few small tools as needed; also an additional lathe is very much needed, to meet the wants of students wishing to learn to turn. A suitable one could be placed in the shop for seventy-five dollars.

The financial account of the department is as follows:

Amount of receipts from all sources	$1,557 14
Amount paid for labor, tools, supplies, etc	1,376 59

Leaving a balance in favor of the department, of $180.55.

Respectfully submitted. T. T. HAWKES,
Superintendent of the Mechanical Department.

REPORT OF SUPERINTENDENT OF WORKSHOPS, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — I herewith submit the following brief report of the Mechanical Department of the College for the year ending June 30, 1882:

The whole number of students enrolled in the department for the year has been 132. Of these, five were young ladies at scroll sawing; all others were assigned to carpenter work. The largest number in regular attendance was 100, during the winter term.

The financial condition of the department will be seen by the following table of expenditures and receipts:

EXPENDITURES.	
Bills for lumber, hardware, and other supplies	$1,153 49
Labor of students and others	635 71
Inventory of June 30th, 1881	1,146 05
Total	$2,935 17
RECEIPTS.	
Cash and vouchers	$1,085 18
Inventory, June 30th, 1882	1,375 37
Balance	474 62
Total	$2,935 17

Respectfully submitted. T. T. HAWKES, *Superintendent.*

REPORT OF THE SUPERINTENDENT OF SEWING FOR THE YEAR 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Permit me to submit the following report of the Sewing Department for 1880 and 1881.

Forty-nine students were enrolled, many remaining through the year. The same course of instruction has been pursued as heretofore, viz., cutting, fitting and making dresses and other domestic articles as needed by the students, either by hand or machine sewing. Good work has been done, and knowledge gained which will be of lasting benefit to those taught. One student completed six dresses during the collegiate year, working one hour per day — that is, one college hour. She was both diligent and industrious. Many others did nearly as well, learning to economize time and material in a marked degree.

The department has the following sewing machines: St. John, New Home, American, Wheeler & Wilson, Secor, and Wilcox & Gibbs.

I gave to a class numbering five, a course of lectures in hygiene and kindred subjects, special for the ladies of the fourth year, running through ten weeks of the fall term.

I also taught a class in household economy, consisting of fourteen students, running through a part of the winter and spring terms; and I must say this class has given most pleasant duties, both in lectures and in practical work — actual cooking, in which the young ladies seconded every effort of mine for improvement in the old methods of household work.

Thank you, gentlemen, for improved facilities in the kitchen laboratory. Also for making my rooms contiguous, thereby lessening my work, and making it much easier to attend to the different work assigned to my department.

Respectfully, Mary E. Cripps.

REPORT OF THE SUPERINTENDENT OF SEWING, 1881-82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Permit me to submit the following report of the Sewing Department for the year 1881-82.

Fifty-two names were enrolled in the Sewing Department. Dresses were made, and other garments necessary to a lady's wardrobe. Dresses were remodeled, and materials of good quality made up in unique design by those who could give the necessary attention to them. Cutting and fitting, sewing by hand and machine, with instructions in the different branches of dress-making and domestic garments, were taught.

A new St. John sewing machine was added to the equipment of the department during the winter term.

A class of eight were taught by lecture in special hygiene, with free discussion of subjects applicable to women as wives and mothers.

I also taught a class of nine in household economy, running through the winter and part of the spring term. The class evinced the greatest interest in practical work, and all subjects pertaining to household management and home-making. I consider this one of the most important studies in the ladies' course, and special hygiene another. The close attention given to these by the young ladies is proof positive of their interest and profit.

I have endeavored to do my duty faithfully, and can afford to await results.

Gentlemen of the Board, I hereby tender my resignation, which I should have done at your previous meeting had there been an opportunity.

Respectfully, MARY E. CRIPPS.

REPORT OF LIBRARIAN, 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN—There have been added to the College library, during the collegiate year 1880-81, about 150 bound volumes and 20 pamphlets, all donations. The numbers of the Encyclopedia Britannica have been purchased as they have appeared, so that now we have eleven volumes of the twenty-one.

The College is indebted to the Kansas delegation in Congress, especially to Hon. J. A. Anderson, for valuable public documents from the various departments of the National Government; to the Hon. James Smith, Secretary of State, for the Journals of the Kansas Legislature for several years; to the Secretaries of the Kansas State Board of Agriculture, of the Kansas State Horticultural Society, of the Kansas State Historical Society, of the Kansas Academy of Science, of the American Agricultural Association, of the Michigan Pomological Society, and of the Massachusetts Horticultural Society, for annual reports of their respective societies. Also to Rev. H. C. Limbocker, for several works on secret societies; to the Hon. Geo. T. Pierce, for the History of Vassar College; to the heirs of the late J. H. Pillsbury, for several volumes of public documents and for several files of the *Scientific American;* to Mrs. Preston, widow of Prof. Preston, who was once a professor in the College, for several volumes of miscellaneous books, some of which are rare and valuable. A portion of the library of the Manhattan Institute (some 300 volumes) has been received in trust, and added to the College library. The most valuable part of this collection is an unbroken set of the Annals of Congress from the first session (1789) to 1824.

The semi-monthly issues of the Patent Office Reports have been regularly received through the year. The exchanges of the *Industrialist* are kept on file in the Library, and are daily accessible to the students. Some members of the Faculty have regularly placed their own private periodicals in the Library. Since the first of January last, the *Scientific American* and supplement, and *Scribner's Monthly Magazine* have been added to the periodicals on file, having been subscribed for by the College authorities. The appreciation in which these are held both by the students and Faculty, suggest the desirableness of having a larger supply of standard periodicals furnished. The Librarian would therefore recommend that the Board consider the advisability of appropriating for the coming year, say $50, for the purchase of standard periodicals, the head of each department being allowed to name at least one of the periodicals subscribed for.

A record book has been prepared and a registry of the books in the Library has been commenced. We hope to complete it during the next year.

A list of books is in course of preparation, with a view to the expenditure of the appropriation ($1,000) made by the last Legislature for the library of the College. It will be soon completed, and the books purchased and placed in the library before the opening of the next collegiate year.

Plans are under advisement for making the College library a more efficient adjunct to each of the departments of the College.

Respectfully submitted. M. L. WARD, *Librarian.*

REPORT OF LIBRARIAN FOR THE YEAR ENDING JUNE 30, 1881–82.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — I have the honor to submit the following report as Librarian of the College for the year ending June 30, 1882:

The legislative appropriation of $1,000 was expended during the early part of the college year. Lists of books selected by the Faculty were prepared by the Librarian and sent to different parties. Bids were asked for each work in the list. It is remarkable that the bids of parties living in different cities differed in the aggregate but a few dollars.

The contract of supplying the books was given to Mr. S. M. Fox, of Manhattan.

There have been added to the library since July 1, 1881:

By purchase	559	volumes.
By donations	108	"
Pamphlets and catalogues	158	"
Total number of additions	825	"

The accompanying schedule gives an itemized list of the additions to the library.

The following is a rough classification of the bound volumes added:

General literature	183
History and biography	136
Agriculture and horticulture	68
Mathematics, mechanics, and art	72
Geography and travels	30
Chemistry, physics, and geology	37
Natural history	54
Metaphysics and political economy	26
Cyclopedias, dictionaries, and other books of reference	29
Public documents not classified	32
Total	667

About fifty pamphlet cases have been purchased, and the pamphlets have been partially classified.

The registry or inventory of all the books in the library, commenced last year, has been finished.

The record shows that there are in the library at present 2,813 volumes, besides about 866 public documents and unbound pamphlets.

The recent additions to the library have made it attractive to the students. The room has been opened during the whole of each school day. The students have had the freest access to all the books. Every person drawing out a book was required to record upon a blank tablet his name, date of drawing, and the name of the book taken. The same entries were made when the book was returned. These entries were daily recorded in the library register by the assistant Librarian. It is gratifying to the Librarian to be able to state that he knows of no single instance where this almost unrestricted freedom of the library was abused by a student.

Students have been found who consented to take a general oversight of the room during the hours they daily spent in the library. Only the work of registering the books has been paid for.

One thing more is needed to make the College library an efficient adjunct in our College work. There should always be some one in the room to aid the inexperienced student in selecting books to read, and to teach him how to use the library to the best advantage. This will doubtless come as the teaching force of the College is increased.

The exchanges of the *Industrialist* have been placed on file, and also the following list of periodicals subscribed for by the College:

Agricultural Gazette. (London.)
Botanical Gazette.
Gardeners' Monthly.
Chemical News. (London.)
American Naturalist.
Die Gewerbehalle (The Workshop).
Scientific American, and supplement.
Van Nostrand's Eclectic Engineering.
Popular Science Monthly.
Journal of the Telegraph.
Journal of the Military Science Institute.

Musical World.
Demorest's Monthly.
What to Wear.
Education.
Journal of Education.
The Century Magazine.
Harper's Monthly Magazine.

The repairs of the library have made it necessary to temporarily transfer all of the books and shelving to another room, where they are at present stored. It is is hoped, however, that they will each and all find a permanent place on the new shelving before the next term opens. A list of books is in preparation, to cover the appropriation of $1,000 available after July 1. The improvements of the library already commenced will double the shelving heretofore required.

As the institution develops, the library must necessarily be enlarged. Already many costly works of reference are called for by the various departments. The Librarian would recommend that the Board ask for another appropriation from the Legislature of $2,000, that at least a thousand dollars a year may be expended until the vacant shelves are filled. He also recommends that at least $100 worth of periodicals be subscribed for in the coming year. Respectfully, M. L. Ward,

Librarian.

The following is a rough classification of books in the Kansas State Agricultural College library, made from register at the close of the year ending June 30, 1882:

	Vols.
Agriculture and horticulture	274
Botany and natural history	177
Chemistry, physics, etc	170
Mathematics, mechanics and art	181
Politics, law, etc	138
Travels and geography	154
History and biography	669
General literature	602
Religious	448
Total	2,813
Public documents	666
Magazines, unbound	200
Total (about)	3,679

REPORT OF LAND AGENT, 1880-81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Find herewith a full report of the business of my department for the fiscal year ending June 30, 1881, showing the condition and location of the land sold and unsold; amount and condition of securities in my charge; location and number of acres for which full payment has been made during the year, and to whom patents have been issued or are due; amount of principal and interest now due; sales, to whom made, and for what sums; and other facts connected with the Land Department; all of which will be found in detail in the several exhibits hereto attached.

The sales during the past year aggregate a total of 7,742.41 acres, at an average of a fraction less than $7.03 per acre, or a total sum of $54,402.72. Of this sum there was paid in cash $10,306.42, and left on installments at 10 per cent. interest, $44,096.30. The average price last year was $6.66 per acre, while the average this year is $7.03, showing that the most valuable lands sell the most readily.

At the close of the last fiscal year there were unsold 24,739.94 acres. This number was increased during the year 3,188.11 acres by cancellation of sales, and decreased by sales the sum of 7,742.41 acres, leaving unsold June 30, 1881, 20,185.64 acres.

There seemed at date of last report a very strong probability of procuring the 7,686.47 acres out of the original endowment; but at this time there is not much prospect of obtaining this indemnity.

At the close of last year there were in my custody securities to the value of $75,026.29. To this sum has been added by sales, $44,096.30; and retired by cancellation, $20,284.23; and by full payment, $14,911.68 — leaving in my hands June 30, 1881, the sum of $83,926.68.

At close of last year there had been patented 40,501.81 acres. Patented or paid out in full during the year, 3,192.45 acres. Entire number of acres patented to June 30, 1881, 43,694.26.

There is but $7,429 of principal past due, and on much of this extension has been granted. Of interest there is due but $1,068.55, and most of it is very likely to be paid during the next three months.

Respectfully submitted. L. R. ELLIOTT,
Agent Kansas State Agricultural College Lands.

MANHATTAN, June 30, 1881.

LIST OF LANDS CANCELED DURING THE FISCAL YEAR ENDING JUNE 30, 1881.

Name.	*Description.*	*No. of acres.*	*Date canceled.*	*No. of install.*	*Canceled principal.*	*Canceled interest.*
B. F. Nickerson	N.½ 7-14-1	314.63	1880. October	3	$1,080 00	....
Haxtun & Baldwin	S.W.¼ 32-13-1 S.½ 6-14-1	473.48	October	7	4,142 95	....
Haxtun & Baldwin	E.½ 17-14-1	320	October	7	2,100 00	$210 00
Haxtun & Baldwin	W.½ 17-14-1	320	October	7	2,380 00	238 00
Haxtun & Baldwin	S.E.¼ 7-14-1	160	October	7	1,260 00	126 00
Olof Nelson	S.E.¼ 17-4-5	160	October	7	700 00	700 00
A. B. Gage	S.W.¼ 14-14-1	160	November	7	910 00	....
H. J. & S. E. Little	N.E.¼ 18-13-2	160	December	4	1,516 28	454 80
C. W. Ball	N.½ 35-14-1	320	1881. February	7	1,985 00	798 00
C. W. Ball	S.½ 26-14-1	320	February	7	1,960 00	784 00
Michael Muckley	S.E.¼ 20-14-2	160	May	6	750 00	300 00
Joseph McLellan	S.W.¼ 34-14-4	160	May	5	650 00	325 00
Peter Snider	N.W.¼ 27-14-2	160	May	7	840 00	336 00
Totals	....	3,188.11	....	....	$20,274 23	$4,271 80

SALES FOR YEAR ENDING JUNE 30, 1881.

Date.	Purchaser.	No. of contract.	DESCRIPTION.				No. of acres.	Price per acre.	Paid at sale.	Amount of contract.	Total sale.
			Tract.	S.	T.	R.					
1880.											
July 7	John D. Myer	11	N.W.¼	5	2	4	162.00	$6 25	$1,012 50	....	$1,012 50
September 24	H. W. Hellman	11	S.E.¼	28	15	4	160.00	8 00	160 00	$1,120 00	1,280 00
October 1	Jesse Engle	12	S.E.¼	25	14	2	160.00	6 30	268 00	740 00	1,008 00
October 4	Jas. Kennedy	13	S E.¼	29	2	3	160.00	6 00	120 00	840 00	960 00
November 23	C. E. Morehouse	14	S.W.¼	14	14	1	160.00	6 50	....	910 00	910 00
November 16	M. Z. Baird	15	N E.¼	32	9	5	160.00	6 50	130 00	910 00	1,040 00
October 1	J. H. Baldwin	16	S.W.¼	32	13	1	160.00	8 75	175 00	1,225 00	1,400 00
October 1	J. H. Baldwin	17	S.E ¼	6	14	1	160.00	8 75	175 00	1,225 00	1,400 00
October 1	J. H. Baldwin	18	S.W.¼	6	14	1	153.48	8 75	167 87	1,175 08	1,342 95
October 1	J. H. Baldwin	19	N.E.¼	17	14	1	160.00	6 56¼	131 25	918 75	1,050 00
October 1	J. H. Baldwin	20	N.W ¼	17	14	1	160.00	7 44	148 75	1,041 25	1,190 00
October 1	J. H. Baldwin	21	S.W.¼	17	14	1	160.00	7 44	148 75	1,041 25	1,190 00
October 1	J. H. Baldwin	22	S.E.¼	17	14	1	160.00	6 56¼	131 25	918 75	1,050 00
October 1	J. H. Baldwin	23	S.E ¼	7	14	1	160.00	7 87½	157 50	1,102 50	1,260 00
October 1	J. H. Baldwin	24	N.E ¼	7	14	1	160.00	3 37½	67 50	472 50	540 00
October 1	J. H. Baldwin	25	N.W.¼	7	14	1	154.63	3 49	67 50	472 50	540 00
December 1	John Chapman	26	S.W.¼	10	9	5	160.00	6 25	125 00	875 00	1,000 00
November 22	Jas. Garrett	27	N.W.¼	11	2	2	160.00	7 25	145 00	1,015 00	1,160 00
December 14	Mrs. S. C. Baker	28	N.E.¼	10	9	5	160.00	6 25	125 00	875 00	1,000 00
December 24	E. J. Webber	29	N.W.¼	4	6	6	163.08	6 50	132 50	927 50	1,060 00
1881.											
January 26	W. L. Morris	30	S.E.¼	20	8	6	160.00	7 00	140 00	980 00	1,120 00
January 16	C. F. Allbrecht	31	S.E.¼	4	15	4	160.00	7 00	140 00	980 00	1,120 00
January 3	F. & H. Lynde	32	N.E.¼	11	2	6	160.00	8 50	170 00	1,190 00	1,360 00
February 1	John Wessels	33	S.W.¼	11	2	2	160.00	7 00	140 00	980 00	1,120 00
February 10	J. P. Fengle	34	N.E.¼	5	15	4	164.68	7 44	149 24	1,044 68	1,193 92
February 15	A. B. Coulson	35	S.E.¼	26	14	1	160.00	7 81	250 00	1,000 02	1,250 00
February 15	A. B. Coulson	36	S.W.¼	26	14	1	160.00	7 81	250 00	1,000 02	1,250 00
February 15	A. B. Coulson	37	N.E.¼	35	14	1	160.00	7 81	250 00	1,000 02	1,250 00
February 15	A. B. Coulson	38	N.W.¼	35	14	1	160.00	7 81	250 00	1,000 02	1,250 00
March 1	Dunahugh & Guthrie	39	N.E ¼	12	2	8	160.00	6 25	125 00	875 00	1,000 00
March 17	Simon Stein	40	S.W.¼	7	14	1	154.27	7 00	134 98	944 91	1,079 89
March 24	Thos. McMahon	41	S.W.¼	32	10	4	160.00	6 50	130 00	910 00	1,040 00
March 29	A. Forney	cash	N E.¼	34	14	1	160.00	7 50	1,200 00	....	1,200 00
March 26	Jas. Clark	42	S.W.¼	22	5	6	160.00	9 00	186 88	1,252 12	1,439 00
April 5	Henry Abeldt	43	N.E ¼	3	15	4	162.80	8 00	162 80	1,139 60	1,302 40
April 6	Wilhelm Luedemann	44	S.E ¼	18	15	4	160.00	8 00	160 00	1,120 00	1,280 00
April 11	Matthew H. Gilbert	45	S.W.¼	4	6	6	160.00	6 25	125 00	875 00	1,000 00
April 16	Chas. Linburg	46	W½ S.E.¼	1	6	5	80.00	6 50	65 00	455 00	520 00
April 25	Solomon Stauffer	47	S.W.¼	7	15	4	153.89	7 50	144 27	1,009 90	1,154 17
April 29	W. H. Thornton	48	N.W.¼	14	3	7	160.00	6 50	130 00	910 00	1,040 00
May 6	Jacob Monty	49	S.E.¼	31	3	4	160.00	7 00	700 00	420 00	1,120 00

SALES FOR THE YEAR ENDING JUNE 30, 1881—CONCLUDED.

Date.	Purchaser.	No. of contract.	DESCRIPTION.				No. of acres.	Price per acre.	Paid at sale.	Amount of contract.	Total sale.
			Tract.	S.	T.	R.					
1881.											
May 6	Jacob Monty	50	S.W.¼	32	3	4	160.00	$7 50	$750 00	$450 00	$1,200 00
May 23	Aaron T. Smith	51	N.W.¼	32	1	8	160.00	6 50	130 00	910 00	1,040 00
May 28	Thomas J. Wilson	52	N.E.¼	26	14	1	160.00	9 00	180 00	1,260 00	1,440 00
June 4	N. P. Anderson	53	N.W.¼	23	5	6	160.00	7 00	140 00	980 00	1,120 00
June 6	W. Thompson	54	S.E.¼	3	3	8	160.00	6 25	125 00	875 00	1,000 00
June 8	Albert B. Coulson	55	S.E.¼	20	14	2	160.00	7 25	145 00	1,015 00	1,160 00
June 8	Nicolaus Koster	56	N.E.¼	15	3	7	160.00	6 25	125 00	875 00	1,000 00
June 14	E. & L. Bacher	57	N.W.¼	1	6	5	153.58	6 25	119 88	840 00	959 88
	Acres sold						7,742.41				
	Average price							$7 03			
	Cash at sale								$10,306 42		
	Installments on contract									$44,096 32	
	Amount of sale										$54,402 74

RECEIPTS DURING THE FISCAL YEAR ENDING JUNE 30, 1881, BY MONTHS.

Month.	*Sales.*	*Installment principal.*	*Interest.*	*Delinquent interest.*	*Total.*
July	$1,012 50	$907 00	$488 50	$6 84	$2,414 84
August		709 00	767 52	34 52	1,511 04
September	160 00	1,146 76	378 14		1,684 90
October	388 00	1,875 00	621 93	20 08	2,905 01
November	130 00	885 34	1,137 90	28 64	2,181 88
December	1,897 87	405 00	190 58	13 98	2,507 43
January	450 00		309 55	6 50	766 05
February	1,289 24	1,370 10	387 33		3,046 67
March	389 98	3,082 50	525 49	21	3,998 18
April	2,173 95	1,689 24	735 88		4,599 07
May	130 00	1,420 00	414 91		1,964 91
June	2,284 88	1,421 74	391 29		4,097 91
Total	$10,306 42	$14,911 68	$6,349 02	$110 77	$31,677 89

LIST OF LANDS PATENTED DURING THE FISCAL YEAR ENDING JUNE 30, 1881.

Name.	*Description.*	*No. of acres.*	*Date patented.*
J. D. Meyer	N.W.¼ 5-2-4	162.00	July 10, 1880.
John Wise	N.E.¼ 15-14-2	160.00	July 28, 1880.
E. B. Purcell	S.W.¼ 2-9-5	160.00	August 17, 1880.
Edward Fisher	N.E.¼ 24-3-7	160.00	September 27, 1880.
H. J. Bond	N.E.¼ 18-2-4	160.00	December 27, 1880.
Joseph Green	N.E.¼ 21-5-6	160.00	November 15, 1880.
John Johnson	S.E.¼ 24-3-7	160.00	October 15, 1880.
Frederick Dalker	N.W.¼ 9-14-4	160.00	October 18, 1880.
Ferdinand Timms	N.E.¼ 9-14-4	160.00	October 18, 1880.
John Haire	N.W.¼ 4-15-4	164.17	February 8, 1881.
F. B. Tyers	N.E.¼ 11-2-8	160.00	March 4, 1881.
R. J. Ross	S.W.¼ 10-3-8	160.00	March 18, 1881.
Simon Stein	S.E.¼ 7-14-1	160.00	May 27, 1881.
H. Laverenz	N.½ of S.E.¼ 20-1-5	80.00	June 15, 1881.
A. H. Hoeft	S.W.¼ 18-2-4	146.28	June 8, 1881.
Henry Glene	N.½ of N.W.¼ 34-1-6	80.00	June 14, 1881.
Louis Knees	S.½ of N.W.¼ 34-1-6	80.00	July 5, 1881.
F. Laverenz	S.½ of S.E.¼ 20-1-5	80.00	July 5, 1881.
E. & F. Müller	N.W.¼ 29-2-5	160.00	June 8, 1881.
W. Brussow	S.W.¼ 13-14-4	160.00	May 17, 1881.
A. Forney	N.E.¼ 34-14-2	160.00	April 4, 1881.
W. A. & J. A. Lewis	S.E.¼ 35-14-1	160.00	April 18, 1881.
Total		3,192.45	

STATEMENT OF SECURITIES.

Value of notes on hand June 30, 1880		$75,026 30
Added by sales to June 30, 1881		44,096 30
		$119,122 60
Paid out	$14,911 68	
Canceled	20,284 23	
		35,195 91
On hand June 30, 1881		$83,926 69

LAND ACCOUNT.

	Acres.
Unsold at report June 30, 1880	24,739.94
Added by cancellation	3,188.11
Total	27,928.05
Sold during year ending June 30, 1881	7,742.41
Unsold June 30, 1881	20,185.64

PRESENT CONDITION OF ENDOWMENT LANDS.

	Acres.
Granted by Congress (net)	82,313.53
Sold and patented to June 30, 1881	43,694.26
Under contract	18,433.63
Unsold	20,185.64
Total	82,313.53
Land in which College has an interest:	
Unsold lands	20,185.64
Under contract	18,433.63
Total	38,619.27
Location of unsold lands:	
Riley county	5,270.09
Clay county	80.00
Marshall county	1,600.00
Dickinson county	5,958.54
Washington county	7,277.01
Total	20,185.64

REPORT OF LAND AGENT, 1881-82.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — I hand you herewith full report of the business done in my department during the fiscal year ending June 30, 1882.

The various schedules and exhibits herewith will show the details of the business, and the value of securities on hand, and the number and location, and the price per acre, of the unsold lands.

The sales made during the year justify the course pursued by your body in maintaining the prices on the lands rather than reducing them, as sales are made as readily at the higher price as probably would be at a lower; and the permanent fund is magnified accordingly. The wisdom of the course pursued will be the more apparent as the years roll on.

If a reduction in the per cent. of interest charged could be reached, the result would be a more permanent investment of the funds. The inclination of purchasers now is, to pay out as soon as possible, to stop the interest.

By cancellation of the sale to Anderson and Finn, the N.W. ¼ of section 32, township 13, range 1, was returned to market.

There is apparently no occasion for further cancellations, and payment is being made on old notes and contracts with reasonable promptness, except in the enduring case of F. E. Thompson, which is an heirloom in the Marshall county court. It seems impossible, however, for even *that* case to go past the August term of the current year.

The question of taxes has become quiet, if not fully settled; and all seems to be in a prosperous condition in my department, as I think will appear by this report.

All of which is respectfully submitted. L. R. Elliott,

Agent Kansas State Agricultural College Lands.

Manhattan, Kansas, June 30, 1882.

STATEMENT OF SECURITIES.

Value of notes on hand June 30, 1881		$83,926 69
Added by sales to June 30, 1882		23,124 18
		$107,050 87
Paid out	$26,617 98	
Canceled	1,400 00	
		28,017 98
On hand June 30, 1882		$79,032 89

LAND ACCOUNT.

	Acres.
Unsold as per report June 30, 1881	20,185.64
Added by cancellation	160.00
Total	20,345.64
Sold during year ending June 30, 1882	4,603.92
Unsold June 30, 1882	15,741.72

STATEMENT OF INTEREST FOR YEAR ENDING JUNE 30, 1882.

Balance due June 30, 1881		$1,068 55
Regularly matured to June 30, 1882	$7,807 25	
Matured by prepayment	1,697 60	
Compound interest accrued	88 70	
Matured by change of contract	142 00	
Overdue payment	2 08	
Total maturities for year		$9,737 63
Total matured to June 30, 1882		$10,806 18
CONTRA.		
Total collections, as per reports	$8,069 48	
Estopped by prepayment	1,075 62	
Estopped by change of contract	91 92	
Canceled	420 00	
Compound interest collected	88 70	
Total		$9,745 72
Balance due and unpaid June 30, 1882		$1,060 46

SALES FOR FISCAL YEAR ENDING JUNE 30, 1882.

Date of sale.	Purchaser.	No. of contract.	DESCRIPTION.				No. of acres.	Price per acre.	Received at sale.	Amount of contract.	Total sale.
			Tract.	S.	T.	R.					
1881.											
July 20	Wm. H. Gray	58	S.E.¼	7	2	2	160.00	$7 00	$140 00	$980 00	$1,120 00
August 18	Charles W. Stowell	59	W.½ of S.E.¼	23	1	8	80.00	6 25	62 50	437 50	500 00
August 18	Clarence E. Eyster	60	E.½ of S.E.¼	23	1	8	80.00	6 25	62 50	437 50	500 00
October 28	Heirs of Mary E. Hanan	....	S.E.¼	18	4	5	160.00	6 75	1,080 00	....	1,080 00
October 28	Heirs of Mary E. Hanan	....	S.W.¼	18	4	5	144.84	7 00	1,013 88	....	1,013 88
November 5	Wm. Scully	....	S.W.¼	32	1	8	160.00	7 00	1,120 00	....	1,120 00
November 23	John L. Book	61	N.W.¼	5	15	4	165.56	7 50	155 21	1,086 49	1,241 70
December 3	Wm. Scully	....	N.E.¼	32	1	8	160.00	6 75	1,080 00	....	1,080 00
December 16	Frederick Hickstein	62	N.W.¼	24	7	5	160.00	6 25	125 00	875 00	1,000 00
December 19	Frederick Hickstein	63	S.W.¼	24	7	5	160.00	6 00	120 00	840 00	960 00
1882.											
January 5	Maynard Mayes	64	S.½ of N.E.¼	15	6	5	80.00	7 00	70 00	490 00	560 00
January 5	Wm. H. and Isaac Mayes	65	N.½ of N.E.¼	15	6	5	80.00	7 00	70 00	490 00	560 00
February 8	Zachariah Cornwell	68	S.W.¼	34	14	4	160.00	7 50	150 00	1,050 00	1,200 00
March 21	J. R. McCullough	70	N.E.¼	32	13	1	160.00	8 50	170 00	1,190 00	1,360 00
April 10	Wm. E. Nims	71	S.W.¼	6	2	4	160.28	6 50	130 23	911 61	1,041 84
May 1	W. E. Stanton	72	S.E.¼	18	2	3	160.00	6 25	250 00	750 00	1,000 00
May 5	Abner Hedge	73	N.E.¼	10	3	8	160.00	6 50	130 00	910 00	1,040 00
May 16	F. M. Forelich	....	S.E.¼	19	14	1	160.00	9 00	1,140 00	....	1,440 00
May 17	Henry Wertz	74	S.E.¼	2	3	8	160.00	6 50	130 00	910 00	1,040 00
May 17	Henry Wertz	75	S.W.¼	2	3	8	160.00	6 25	125 00	875 00	1,000 00
May 17	Henry Wertz	76	N.W.¼	11	3	8	160.00	7 00	140 00	980 00	1,120 00
May 22	Nels Johnson	77	N.E.¼	9	6	6	160.00	6 25	125 00	875 00	1,000 00
June 1	Bullock and Baker	78	N.E.¼	19	14	1	160.00	10 00	200 00	1,400 00	1,600 00
June 1	Bullock and Baker	79	N.W.¼	20	14	1	160.00	9 25	185 00	1,295 00	1,480 00
June 1	Bullock and Baker	80	S.W.¼	20	14	1	160.00	9 50	190 00	1,330 00	1,520 00
June 2	C. W. Anthony	81	N.W.¼	19	1	2	151.62	6 25	118 45	829 17	947 62
June 7	C. O. Nelson	82	N.E.¼	8	5	6	160.00	6 25	400 00	600 00	1,000 00
June 13	Geo. H. Baker	83	S.E.¼	15	14	1	160.00	7 00	140 00	980 00	1,120 00
June 24	John Swanson	84	N.E.¼	1	6	5	152.76	7 00	133 67	935 65	1,069 32
June 20	Meeker and Sanford	86	N.E.¼	10	2	2	160.00	7 50	145 00	1,015 00	1,160 00
June 26	H. S. Davis	87	N.W.¼	18	2	4	148.86	5 00	93 04	651 26	744 30
	Totals	....	....	....	....	....	4,603.92	....	$9,494 48	$23,124 18	$32,618 66

LIST OF LANDS PATENTED DURING THE YEAR ENDING JUNE 30, 1882.

Name.	*Description.*	*No. of acres.*	*Date patented.*
James Creighton	N.W.¼ 30-2-3	153.94	October 25, 1881.
Robert McGregor	S.W.¼ 14-2-2	160.00	July 27, 1881.
J. H. Baldwin	S.W.¼ 32-13-1	160.00	August 26, 1881.
James A. Gillett	N.E.¼ 26-14-4	160.00	September 7, 1881.
Martin Schropp	N.E.¼ 23-2-4	160.00	October 25, 1881.
Heirs of Mary E. Hanan	S.½ 18-4-5	304.84	November 1, 1881.
Andrew Blumb	S.W.¼ 15-3-3	160.00	November 2, 1881.
Wm. Scully	S.W.¼ 32-1-8	160.00	November 10, 1881.
Wm. Scully	N.E.¼ 32-1-8	160.00	December 5, 1881.
Charles Miermeister	S.W.¼ 27-14-2	160.00	December 23, 1881.
Americus L. Pogue	S.½ 6-14-1	313.48	December 28, 1881.
Americus L. Pogue	All of 17-14-1	640.00	December 28, 1881.
Alex. McLaren	S.E.¼ 23-2-2	160.00	October 10, 1881.
Americus L. Pogue	N.½ 7-14-1	314.63	January 2, 1882.
Alex. McBoyle	N.W.¼ 26-14-1	160.00	February 2, 1882.
J. T. Hale	N.E.¼ 18-2-3	160.00	March 7, 1882.
F. A. Hollensteiner	S.W.¼ 25-14-2	160.00	April 6, 1882.
Joel Hersh	N.½ 32-14-2.	320.00	April 10, 1882.
Joel Hersh	S.E.¼ 32-14-2	160.00	April 10, 1882.
David Griffis	S.E.¼ 4-5-8	160.00	June 23, 1882.
Paulus Tischauser	N.E.¼ 26-14-2	160.00	May 16, 1882.
W. W. Bishop	S.½ 23-14-1	320.00	April 17, 1882.
A. B. Coulson	S.E.¼ 20-14-2	160.00	April 21, 1882.
Martin Schreiber	S.W.¼ 2-2-6	160.00	May 3, 1882.
F. M. Froehich	S.E.¼ 19-14-1	160.00	May 17, 1882.
George H. Blumb	S.E.¼ 15-3-3	160.00	June 17, 1882.
Total		5,406.89	

PRESENT CONDITION OF ENDOWMENT LANDS.

Granted by Congress		82,313.53
Patented June 30, 1881	43,694.26	
Patented to June 30, 1882, (cash sales)	784.84	
Patented former sales (paid out)	4,622.05	
Under contract June 30, 1882	17,470.66	
		66,571.81
Unsold June 30, 1882		15,741.72
Lands in which the College has an interest:		
Unsold lands		15,741.72
Under contract		17,470.66
Total		33,212.38
Location of unsold lands:		
Riley county		4,477.33
Clay county		80,00
Marshall		320.00
Dickinson county		4,832.98
Washington county		6,031.41
Total unsold		15,741.72

REPORT OF LOAN COMMISSIONER, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen — Herewith find report of the investment of the endowment funds of the Kansas State Agricultural College, as shown by the records of this office, from July 1, 1880, to June 30, 1881:

Invested in 7 per cent. school bonds	$47,733 00
" 6 per cent. school bonds	300 00
" 6 per cent. township bonds	20,000 00
" freeing real estate	881 75
" paid Mutschler claim	504 00
Invested during the year	$69,418 75

All of which is respectfully submitted, with a request that a committee be appointed to examine the books and papers of this office, that my accounts be audited and approved. M. L. WARD, *Loan Commissioner.*

MANHATTAN, KAS., June 30, 1881.

REPORT OF LOAN COMMISSIONER, 1881-82.

To the Board of Regents of the Kansas State Agricultural College:

GENTLEMEN — Herewith find report of the investment of the endowment funds of the Kansas State Agricultural College, as shown by the records of this office, from July 1, 1881, to June 30, 1882

Invested in school bonds	$53,148 72
Invested in township refunding bonds	23,500 00
Invested in bridge bonds	5,700 00
Invested during the year	$82,348 72

All of which is respectfully submitted, with a request that a committee be appointed to examine the books and papers of this office, that my accounts be audited and approved.

M. L. WARD,
Loan Commissioner.

JUNE 30, 1882.

SECRETARY'S REPORT.

To the Regents of the Kansas State Agricultural College:

GENTLEMEN — In accordance with your expressed wish, I present for publication in your biennial report a condensed statement of accounts kept in the Secretary's office, and presented for your approval at each regular quarterly meeting.

Each bill presented is at once entered upon the books with a file number, the date of filing, date of approval by the Board, and date of payment, being at the same time and in the same place charged to the College department in which the expenditure is made. These bills are all executed in triplicate. One is filed with the department superintendent, whose approval is necessary before entry upon the books; two are perfected as vouchers by signature of the Secretary to their correctness, and of the President of the Board to their approval by the Board, and finally, upon payment in the hands of the

Treasurer, by the receipt of the maker of the bill. One of these duplicate vouchers is then filed in the vault of the Treasurer, and the other is returned to the Secretary, as a voucher for the Treasurer's monthly report, and filed in the College vault for ready reference.

At the close of each month, reports received from the Treasurer, the Land Agent and the Loan Commissioner are brought together, item by item, upon accounts of endowment fund, income fund and appropriations, as well as department receipts and expenditures. The monthly balances of land on sale, securities of every kind, and cash in every fund, are also recorded for your inspection, so that all the fluctuations of the funds can be seen at a glance. The footings of monthly expenditures in the several departments are also posted to the annual account of receipts and expenditures.

Summaries of the above-mentioned accounts for the years ending June 30, 1881, and June 30, 1882, I present in concise form, showing for each department the expenditures from appropriations, from income fund direct and through other departments, receipts in cash, and through credits with other departments, as well as increase in value of property. The balance in each case shows either the actual expense of maintaining the department, or the actual proceeds from its management. The final balance in each statement shows the actual improvement of the College in financial condition and property during the year, exclusive of increase in the endowment.

The sources of income, and the amount from each source in each year, are also given from the totals under monthly statement. A transcript of monthly balances shows the actual condition of funds at the close of each month, including all fluctuations of investments, and gradual increase of endowment by sales of lands.

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1880–81.

Departments.	EXPENDITURES.		RECEIPTS.		*Increase in inventory.*	*Actual expense.*	*Actual proceeds.*
	Appropriations.	*Cash account.*	*Cash account.*	*Refunding appria'ns.*			
Instruction		$12,050 00				$12,050 00	
Executive	$380 12	3,441 40	$562 78	$1,438 19	$479 16	1,341 39	
Farm	8 52	2,073 93	1,672 17		778 49		$368 21
Horticultural		1,012 52	55 79		648 90	307 83	
Chemical	539 49	446 03	100 60		868 47	16 45	
Mechanical		1,376 59	1,557 14		40		180 95
Printing		939 62	787 55		195 94		43 87
Telegraph		237 62	200 24		125 00		87 62
Cooking and sewing		30 15	12 90			17 25	
Library		147 21				147 21	
Music		155 00			155 00		
Drawing		67 95			61 95	6 00	
Mathematical		3 00			3 00		
English							
Treasury		1,648 63	24,765 63				23,117 00
Land		440 87	6,459 79				6,018 92
Loan		380 98		5,540 90			5,159 92
Totals	$928 13	$24,451 50	$36,174 59	$6,979 09	$3,316 31	$13,886 13	$34,976 49

Grand totals—Expenditures, $25,379 63........................Returns, $46,459 99
Balance—Improvement........ $21,090 36.. $21,090 36

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1881-82.

DEPARTMENTS.	EXPENDITURES.			RECEIPTS.		Inventory increase.	Actual expense.	Actual proceeds.
	Appropriations.	*Income fund.*	*Departm't transfers.*	*Cash.*	*Departm't transfers.*			
Instruction,		$11,679 99					$11,679 99	
Executive	$353 67	3,182 62	$834 10	$303 38	$35 18	$1,511 65	2,520 18	
Farm	957 70	2,976 20	93 55	1,712 16	415 65	799 60	1,100 04	
Horticult'l	222 40	1,488 51	369 42	153 05	63 10	1,201 05	663 13	
Chemical	11 67	318 01	78 65	109 00		93 55	205 78	
Mechanical,		1,787 52	1 60	205 35	879 83	229 32	474 62	
Printing		1,072 95	34 56	301 65	361 35	168 45	276 06	
Telegraph		330 27	18 40	291 45		261 25		$204 03
Sewing and cooking		70 20	4 90	29 90		61 78		16 58
Mathemat'l,		5 00		5 00		3 00		3 00
English								
Drawing		53 97	5 83			45 15	14 65	
Music		100 50				9 00	91 50	
Library	999 51	241 15	247 00			1,415 95	71 71	
Land		405 79	1 50	8,158 18				7,750 89
Loan		836 44	13 20				849 64	
Military		52 30	52 40			104 70		
Treasury		6,424 15		17,621 64		(6,030 40)		17,227 89
Newbuild'g,	14,907 05					14,907 05		
Totals	$17,452 00	$31,025 57	($1,755 11)	$28,890 76	($1,755 11)	$26,841 90	$17,947 30	$25,202 39

Grand totals—Expenditures, $48,477.57............................Returns, $55,732.66.
Balance—Improvement........ 7,255.09.. $7,255.09

SOURCES OF INCOME, 1880-81.

TREASURER'S COLLECTIONS.		
Interest on bonds, 6 to 10 per cent	$21,471 72	
Interest on real-estate securities, 8 to 10 per cent	611 00	
Delinquent interest	1,605 24	
Rent of real estate	1,077 67	
Refunding appropriation	6,979 09	
		$31,744 72
LAND AGENT'S COLLECTIONS.		
Interest on securities, 10 per cent	$6,349 02	
Interest on delinquent interest	110 77	
		6,459 79
COLLEGE DEPARTMENT RECEIPTS.		
Rents of buildings	$390 65	
Fees from students	425 50	
Sales of produce, stock, etc	1,913 60	
Credits between departments	2,163 42	
Freight charges refunded	56 00	
		4,949 17
Total		$43,153 68

SOURCES OF INCOME, 1881-82.

TREASURER'S COLLECTIONS.		
Interest on bonds, 10 per cent	$6,516 68	
Interest on bonds, 7 per cent	6,601 69	
Interest on bonds, 6 per cent	2,419 00	
Interest on real estate securities, 10 per cent	106 50	
Interest on real estate securities, 8 per cent	1,235 35	
Delinquent interest	742 42	
		$17,621 64
LAND AGENT'S COLLECTIONS.		
Interest on securities, 10 per cent	$8,069 48	
Interest on delinquent interest	88 70	
		8,158 18
COLLEGE DEPARTMENT RECEIPTS.		
Rent of buildings	$230 10	
Fees from students	466 75	
Sales of produce, stock, etc	2,361 79	
Freights returned	52 30	
		3,110 94
Total		$28,890 76

ENDOWMENT FUND, MONTHLY BALANCES, 1880-81.

MONTHS.	LAND AGENT.	COLLEGE TREASURER.					TOTAL FUND.	
	Land contracts, 10 per cent.	*Bonds, 6 to 10 per cent.*	*Real estate securities, 8 to 10 per cent.*	*Unproductive claims.*	*Real estate.*	*Uninvested cash.*	*Productive.*	*Total fund.*
July	$74,119 29	$153,693 64	$19,538 35	$17,695 97	$1,712 78	$30,141 52	$247,351 28	$296,901 55
August	73,410 29	156,910 85	19,538 35	17,695 97	1,712 78	27,633 31	249,859 49	296,901 55
September	73,383 53	165,687 85	18,538 35	17,695 97	1,712 78	21,163 07	257,609 73	291,181 55
October	73,088 53	174,232 85	18,538 35	17,695 97	1,712 78	14,881 07	265,861 73	300,149 55
November	73,113 19	181,849 13	18,988 35	17,695 97	1,712 78	7,830 13	273,950 67	301,189 55
December	72,814 04	184,359 59	16,915 00	17,695 97	1,712 78	9,685 89	274,088 63	303,193 27
January	72,009 04	181,363 18	16,915 00	17,695 97	1,712 78	12,642 30	270,287 22	302,838 27
February	76,663 63	179,662 33	16,915 00	17,695 97	1,712 78	17,502 49	273,240 96	310,152 20
March	76,311 04	188,247 12	15,690 00	17,695 97	1,712 78	13,615 18	280,248 16	313,272 09
April	81,383 42	198,447 12	15,690 00	5,630 40	1,712 78	19,343 94	295,520 54	322,207 66
May	80,873 42	197,970 12	15,690 00	5,630 40	1,712 78	21,370 94	294,533 54	323,247 66
June	83,926 69	185,932 99	15,690 00	5,630 40	1,712 78	37,114 69	285,549 68	330,007 55

ENDOWMENT FUND—MONTHLY BALANCES, 1881-2.

MONTHS.	LAND AGENT.	COLLEGE TREASURER.							TOTAL FUND.	
	Securities, 10-per-cent.	*Securities, 10-per-cent.*	*Securities, 8-per-cent.*	*Securities, 7-per-cent.*	*Securities, 6-per-cent.*	*Real estate.*	*Unproductive claims.*	*Uninvested cash.*	*Productive.*	*Total fund.*
July	$83,466 69	$78,473 11	$14,625 00	$89,399 07	$43,800 00	$1,712 78	$5,630 40	$14,000 64	$309,763 87	$331,107 69
August	82,064 19	78,313 11	14,625 00	90,819 07	48,300 00	1,712 78	5,630 40	9,643 14	314,121 37	331,107 69
September	81,594 18	77,635 31	14,625 00	95,703 47	55,791 00	1,712 78	5,630 40	*—584 48	326,858 39	332,107 69
October	79,894 86	77,635 31	14,625 00	100,180 47	56,939 00	1,712 78	5,630 40	*—2,416 25	328,209 64	334,201 57
November	79,647 29	76,853 31	14,625 00	102,995 47	57,439 00	1,712 78	....	3,290 42	331,560 07	336,563 27
December	73,247 87	76,102 14	14,625 00	105,717 47	57,439 00	1,712 78	....	9,359 01	327,131 48	338,203 27
January	73,002 87	73,127 56	14,625 00	105,617 47	61,814 00	1,712 78	....	8,526 59	329,083 90	339,323 27
February	73,027 87	72,137 72	19,025 00	105,027 00	64,277 00	1,712 78	....	5,315 90	333,494 59	340,523 27
March	72,232 70	71,667 72	18,200 00	105,527 00	65,847 00	1,712 78	....	6,696 07	333,474 42	341,883 27
April	67,384 31	72,394 47	18,200 00	106,477 00	66,447 00	1,712 78	....	10,309 55	330,902 78	342,925 11
May	71,306 81	68,109 72	18,200 00	107,727 00	66,947 00	1,712 78	....	16,561 80	332,290 53	350,565 11
June	79,032 89	61,029 62	18,200 00	107,395 00	73,447 00	1,712 78	....	20,389 06	339,104 51	361,206 35

* Overdraft.

SUMMARY OF INVENTORY.

EXECUTIVE DEPARTMENT.		
Farm and grounds	$22,000 00	
College buildings, in use	40,153 97	
Furniture, fixtures, etc	2,901 26	$65,055 23
FARM DEPARTMENT.		
Barn, sheds, etc	$4,625 00	
Furniture and fixtures	265 00	
Teams, horses and mules	550 00	
Cattle, 27 head	5,910 00	
Swine, 40 head	400 00	
Implements, harness, etc	741 15	
Produce in barns	37 50	
Crops, in ground, cost	441 95	12,970 60
HORTICULTURAL DEPARTMENT.		
Furniture and apparatus	$1,381 55	
Tools, implements, etc	326 00	
Cabinet collections	575 00	
Stock in plantations	300 00	
Team	130 00	2,712 55
CHEMICAL DEPARTMENT.		
Physical apparatus	$930 00	
Chemical apparatus	1,279 74	
Chemicals in stock	170 37	
Furniture and fixtures	132 40	
Cabinet of minerals, etc	2,000 00	4,412 76
MECHANICAL DEPARTMENT.		
Tools, carpenter shop	$937 12	
Tools, blacksmith shop	188 95	
Lumber and other stock	249 30	1,375 37
PRINTING DEPARTMENT.		
Presses, type, cases, etc	$1,386 88	
Stock, books, etc	112 65	1,499 53
TELEGRAPH DEPARTMENT.		
Line, instruments, etc	$622 20	
Supplies, books, etc	21 30	643 50
COOKING AND SEWING DEPARTMENT.		
Kitchen furniture, pantry, etc	$204 85	
Sewing machines, fixtures, etc	320 50	525 35
DRAWING DEPARTMENT.		
Tables, models, patterns, tools, etc		240 40
VARIOUS DEPARTMENTS.		
Mathematical apparatus, tools, charts, etc	$265 75	
Armory cases, etc	84 60	
College library	4,415 95	4,766 30
Cost of new building to date		14,907 05
Total property at the College		$109,108 64

Quarterly statements have been recorded in the regular proceedings of the Board, and published in the *Industrialist*, a copy of which is furnished to each State officer, each member of the Legislature, and every newspaper in the State. Inspection of the books is always welcomed, and persons interested in the College have often made such inspection. The effort is to keep them in such a simple but complete form that all may understand them.

The files of vouchers are so kept as to be readily referred to; so that each item of expenditure for eight years past can be seen if desired.

I include in this report a brief summary of the inventory taken June 30, 1882, showing the general distribution of property now at the College. The complete inventory showing every item of value, is recorded in a book for the purpose kept in the College vault.

All correspondence pertaining to business matters is carefully filed for ready reference and preservation.

Respectfully submitted.
GEORGE T. FAIRCHILD,
Secretary of Board.
COLLEGE, Nov. 15, 1882.

ADDENDA.

Quarterly statement of Secretary to September 30, 1882, as published in the *Industrialist:*

ENDOWMENT FUND.

WITH TREASURER.		
School bonds, 10 per cent	$56,827 40	
School bonds, 7 per cent	112,709 32	
School bonds, 6 per cent	55,239 00	
		$224,775 72
Township bonds, 10 per cent	$1,500 00	
Township bonds, 8 per cent	5,000 00	
Township bonds, 6 per cent	52,800 00	
		59,300 00
Real-estate securities, 10 per cent	$1,065 00	
Real-estate securities, 8 per cent	13,200 00	
		14,265 00
Real-estate for sale, cost		1,712 78
		$300,053 50
Less over-draft for investment		12,378 49
		$287,675 01
WITH LAND AGENT.		
Notes, old form of contract, 10 per cent	$17,747 19	
Installments, new form of contract, 10 per cent	79,563 59	
Collections, cash	1,179 08	
		98,489 86
Total fund		$386,164 87
Productive		$395,654 50
Unproductive		2,891 86
Due Treasurer		12,378 41
Lands unsold 12,590.37 acres.		

INCOME FUND.

WITH TREASURER.	
Cash on hand after payment of approved bills	$8,819 03
WITH LAND AGENT.	
Collections, cash	257 18
Total	$9,076 21

APPROPRIATIONS.

IN COLLEGE TREASURY, UNEXPENDED BALANCES AFTER PAYMENT OF APPROVED BILLS.	
New building	$2,530 86
Library	700 23
Repairs and furniture	46 21
Farm stock, fences, etc	33 78
Horticultural cabinets	27 60
Chemical laboratory cases	148 84
Total	$3,487 52

GEO. T. FAIRCHILD, *Secretary of Board.*

TREASURER'S REPORT, 1880–81.

To the Board of Regents of the Kansas State Agricultural College:

Gentlemen—Herewith I submit for your inspection my report for the fiscal year ending June 30, 1881:

INTEREST ACCOUNT.

Balance due Treasurer, as per report June 30, 1880	$5,598 14	
Paid out on approved vouchers	24,593 50	
		$30,191 64
Received from all sources since June 30, 1880		42,295 68
Balance in hand of Treasurer		$13,104 04

LAND SALE ACCOUNT.

Balance on hand, as per report June 30, 1880	$29,569 49	
Received from all sources since June 30, 1880	76,963 95	
		$106,533 44
Paid warrants of Loan Commissioner		69,418 75
*Balance in hands of Treasurer		$37,114 69

*Memorandum.—I paid June 15, 1881, in New York, for $13,500 of Manhattan township 6-per-cent. bonds. I also paid Matt. Thompson, County Superintendent, $1,000 for bonds of School District No. 52, Wabaunsee county, on May 27, 1881. I have not yet got warrants of Loan Commissioner for these amounts, and they are not charged up to your land-sale account. This leaves the amount of your endowment fund not actually invested, $22,614.69.

REFUNDING TAX APPROPRIATION.

Balance in hands of Treasurer, June 30, 1880	$1,569 57
Transferred to land-sale account, by order Board of Regents	1,569 57

ENDOWMENT AND INCOME FUND.

APPROPRIATION ACCOUNT.

Received from State Treasurer		$17,979 09
Paid on order Board of Regents	$11,000 00	
Paid on order Board of Regents	1,438 19	
Paid on order Board of Regents	5,540 90	
		17,979 09

REPAIRS AND FURNITURE APPROPRIATION ACCOUNT.

Received from State Treasurer	$800 00	
Paid approved vouchers	380 12	
Balance in hands of Treasurer		$419 88

CHEMICAL DEPARTMENT APPROPRIATION.

Received from State Treasurer	$700 00	
Paid approved vouchers	539 49	
Balance in hands of Treasurer		$160 51

HORTICULTURAL DEPARTMENT APPROPRIATION.

Received from State Treasurer	$250 00

FARM DEPARTMENT APPROPRIATION.

Received from State Treasurer	$1,000 00	
Paid approved vouchers	8 52	
Balance in hands of Treasurer		$991 48

SECURITIES IN HANDS OF TREASURER.

Refunding tax appropriation, act of Legislature of 1877	$5,000 00	
Less balance refunded	1,569 57	$3,430 43
Redemption tax certificates on College lands, paid by order of the Board of Regents		1,695 97
Real-estate securities, and real estate taken under foreclosure, viz., notes for real estate resold	$4,490 00	
Contracts for real estate resold	11,200 00	
Real estate yet on hand, representing a value on the Treasurer's books of	1,712 78	
Geo. Mutschler claim — act of Legislature of 1881	504 00	17,906 78
Ten-per-cent. bridge bonds, Noble township, Marshall county		800 00
Ten-per-cent. school bonds		77,713 92
Seven-per-cent. school bonds		87,119 07
Six-per-cent. school bonds		300 00
Six-per-cent. Manhattan township, Riley county, bonds		20,000 00
Total		$208,966 17
Of the above-named school bonds in my possession, there are now past due—		
Ten-per-cent. bonds	$9,587 06	
Seven-per-cent. bonds	1,000 00	$10,587 06
There are also in my hands, past due, coupons of—		
Ten-per-cent. bonds	$1,681 68	
Seven-per-cent. bonds	376 05	$2,057 73

The above bonds and coupons draw interest at the rate of 10 per cent. and 7 per cent. respectively, after due.

All of which is respectfully submitted, with the request that you appoint a committee to examine and report upon the securities in my hands.

E. B. PURCELL, *Treasurer.*

MANHATTAN, KAS., July 13, 1881.

TREASURER'S REPORT, 1881–82.

To the Board of Regents, Kansas State Agricultural College:

GENTLEMEN: Herewith I submit for your inspection my report for the fiscal year ending June 30th, 1882:

INTEREST ACCOUNT.

Balance in hands of Treasurer June 30, 1881	$13,104 04	
Received from all sources since	28,890 76	
	$41,994 80	
Paid on approved vouchers	31,025 57	
Balance in hands of Treasurer June 30, 1882		$10,969 23

LAND SALE ACCOUNT.

Balance in hands of Treasurer June 30, 1881	$37,114 69	
Received from all sources since	66,573 09	
	$103,687 78	
Paid approved vouchers	83,298 72	
Balance in hands of Treasurer June 30, 1882		$20,389 06

REPAIRS AND FURNITURE APPROPRIATION.

Balance in hands of Treasurer June 30, 1881	$419 88	
Paid approved vouchers	353 67	
Balance in hands of Treasurer June 30, 1882		$66 21

CHEMICAL DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer June 30, 1881	$160 51	
Paid approved vouchers	11 67	
Balance in hands of Treasurer June 30, 1882		$148 8

HORTICULTURAL DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer June 30, 1881	$250 00	
Paid approved vouchers	222 40	
Balance in hands of Treasurer June 30, 1882		$27 60

FARM DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer June 30, 1881	$991 48	
Paid approved vouchers	957 70	
Balance in hands of Treasurer June 30, 18		$33 78

LIBRARY APPROPRIATION.

Received from State Treasurer July 8, 1881	$1,000 00	
Paid approved vouchers	999 51	
Balance in hands of Treasurer June 30, 1882		$0 49

BUILDING APPROPRIATION.

Received from State Treasurer, July 8, 1881	$5,000 00	
“ “ August 8, 1881	2,500 00	
“ “ September 13, 1881	2,500 00	
“ “ November 7, 1881	5,000 00	
		$15,000 00
Paid approved vouchers		14,907 05
Balance in hands of Treasurer June 30, 1882		$92 95

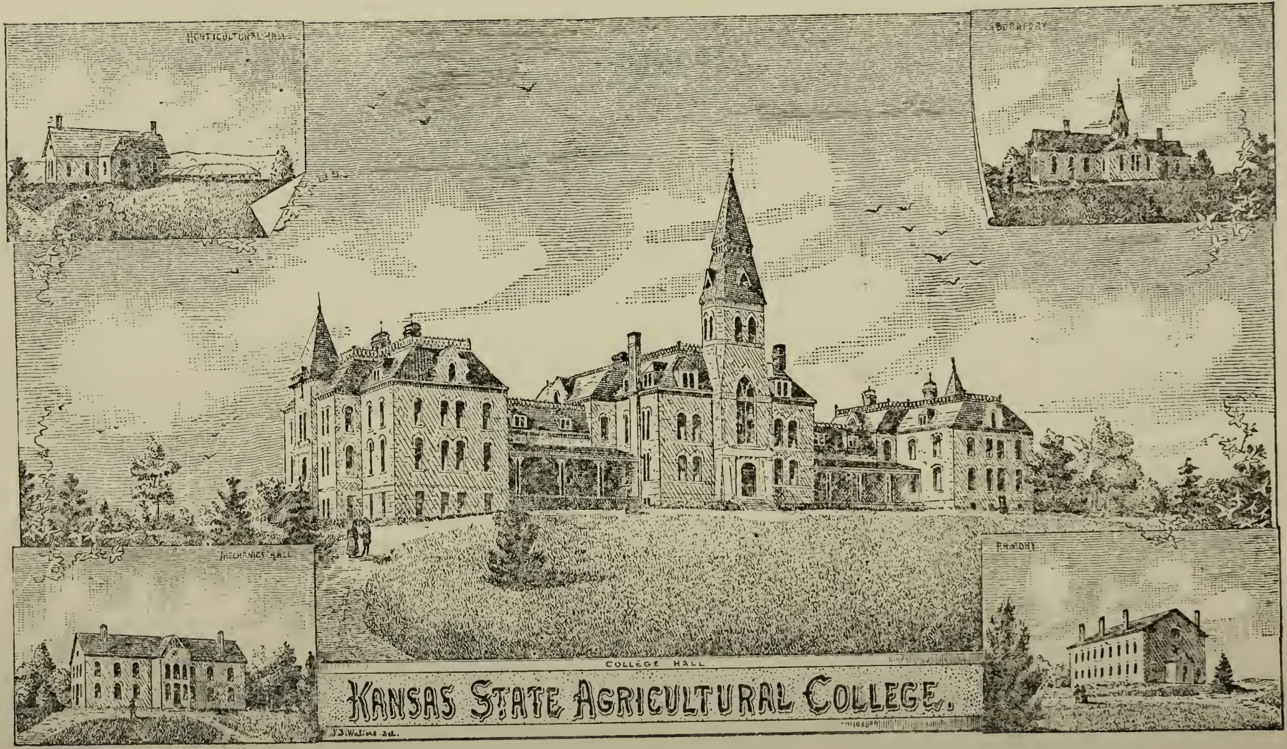
SECURITIES IN HANDS OF TREASURER JUNE 30, 1882.

6-per-cent. Manhattan township, Riley county, funding bonds		$43,500 00
8-per-cent. Pawnee Rock township, Barton county, bridge bonds		5,000 00
10-per-cent. Noble township, Marshall county, bridge bonds		800 00
10-per-cent. Little Walnut township, Butler county, bridge bonds		700 00
10-per-cent. school bonds	$58,464 62	
7-per-cent. school bonds	107,395 00	
6-per-cent. school bonds	29,947 00	
		195,806 62
10-per-cent. notes for real estate sold	$1,065 00	
8-per-cent. notes for real estate sold	2,000 00	
8-per-cent. contracts for real estate sold	11,200 00	
Represented by 160 acres land unsold	1,712 78	
		15,977 78
Total		$261 784 40
Of the above securities, there are now past due, as shown by inventory herewith submitted—		
10-per-cent. school bonds	$5,659 62	
7-per-cent. school bonds	1,717 53	
		$7,377 15
There are also in my hands, past due, coupons as follows:		
Of school bonds	$5,237 61	
Of bridge bonds	163 30	
		$5,400 91

All of which is respectfully submitted.

E. B. Purcell, *Treasurer K. S. A. College.*

Manhattan, Kas., June 30, 1882.


HORTICULTURAL HALL
LABORATORY
MECHANICS HALL
ARMORY
COLLEGE HALL
KANSAS STATE AGRICULTURAL COLLEGE.
J.S.Walins sc.

STATE AGRICULTURAL COLLEGE.

FOURTH BIENNIAL REPORT

OF THE

REGENTS AND FACULTY.

1883-4.

WITH APPENDIX.

TOPEKA, KANSAS:
KANSAS PUBLISHING HOUSE: T. D. THACHER, STATE PRINTER.
1885.

KANSAS STATE AGRICULTURAL COLLEGE.

MANHATTAN, KAS., December 1, 1884.

To His Excellency Governor G. W. Glick:

DEAR SIR—I transmit herewith, according to law, the biennial report of the Board of Regents of the State Agricultural College of Kansas, including the annual reports of the several professors and instructors, for the years ending June 30th, 1883, and June 30th, 1884.

Respectfully yours,
GEO. T. FAIRCHILD,
Secretary of the Board of Regents.

REGENTS' REPORT 1882–84.

To His Excellency Geo. W. Glick, Governor of the State of Kansas:

SIR—The Regents of the State Agricultural College respectfully submit the following report for the two years ending June 30th, 1884, with accompanying documents showing the growth and general condition of the institution in all its departments.

The two years have been marked by general prosperity throughout the State, and the College has fully maintained its place in the general thrift. Its buildings and grounds have become a noticeable feature in the improvements of the State, and its inventory of property has grown from $109,108.64 to $145,857.95. Its annual attendance has increased 26 per cent.—from 312 to 395 students of an average age of over 19 years, and representing 55 counties of this State, and 10 other States. The graduating class has increased from 9 to 17, and other classes have grown in proportion, so that many have to be subdivided, increasing the cares of professors and requiring additional instructors. The general discipline and good order have been maintained with marked success, and the repute of the College for adaptation to the objects for which it was founded has become widespread.

The course of study has not been materially changed, but in minor particulars has been more nicely adjusted to meet the wants of sons and daughters of farmers coming directly from the common schools for an education that may aid them in their lives of industry.

GENERAL COURSE OF STUDY.

Each student is expected to take three studies besides one hour's daily practice in an industrial art; and variation from this rule can only be made with consent of the Faculty.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following gives the general scope of the two, but fuller explanations are found in the annual catalogue:

FIRST YEAR — FALL TERM.

Arithmetic.
English Analysis.
Geometrical Drawing.

WINTER TERM.

Book-keeping, Drawing.
English Structure.
United States History.

SPRING TERM.

Algebra.
English Composition.
Botany.

SECOND YEAR — FALL TERM.

Algebra completed.
Elementary Chemistry.
Horticulture.
Fourteen Lectures in Military Science.

WINTER TERM.

Geometry.
Practical Agriculture, or Household Economy.
Organic Chemistry, Mineralogy.
Twelve Lectures in Military Science.

SPRING TERM.

Geometry completed, five weeks, and Drawing, five weeks.
Entomology.
Analytical Chemistry.

THIRD YEAR — FALL TERM.

Trigonometry and Surveying.
Physiology.
General History.

WINTER TERM.

Mechanics.
Agricultural Chemistry.
Rhetoric.

SPRING TERM.

Civil engineering with Drawing, or Hygiene.
Chemical Physics.
English Literature.

FOURTH YEAR — FALL TERM.

Agriculture, or Literature.
Meteorology.
Psychology.

WINTER TERM.

Logic, deductive and inductive.
Zoölogy.
Structural Botany.

SPRING TERM.

Geology.
United States Constitution.
Political Economy.

Farming, gardening and carpentry are required of young men for one term each; and cooking and dairying of young women.

To this is added a systematic training in some of the most important of the industrial arts, drill in elocution and correct English expression, and a course of lectures from members of the Faculty upon topics of general interest. An arrangement for occasional lectures by distinguished men of the State has been completed, and courses of lectures by the State Veterinarian are confidently expected.

Provision for instruction in military science and tactics has been continued under the United States statutes, an officer being detailed for such instruction free of expense to the College; and nearly one-half the male students have voluntarily entered such classes. All young men of the second year are required to attend a brief course of lectures upon the organization of the national army, and matters of interest to every citizen.

The Faculty of Instruction has had some changes. At the close of the college year in 1883, Professors M. L. Ward and J. E. Platt retired at the request of the Board. Lieut. Albert Todd, detailed for three years, was relieved at the expiration of the detail on July 1st, 1884. M. A. Reeve, acting superintendent of shops during a part of 1882–3, was not reëngaged, and several additions have been made to meet the increased demand for instruction. The Faculty, as now organized, is as follows, the salary to be paid for the ensuing year being appended:

FACULTY OF INSTRUCTION.

George T. Fairchild, A. M., President, Professor of Logic and Political Economy	*a* $2,500
Edward M. Shelton, M. Sc., Professor of Agriculture and Superintendent of Farm	*a* 1,800
George H. Failyer, M. Sc., Professor of Chemistry and Physics	1,600
Edwin A. Popenoe, A. M., Professor of Horticulture and Entomology, Superintendent of Orchards and Gardens	1,600
William A. Kellerman, Ph. D., Professor of Botany and Zoölogy	1,600
Benjamin F. Nihart, A. M., Professor of Mechanics and Engineering	1,400
David E. Lantz, Professor of Mathematics	1,400
William J. Nicholson, Lieut. Seventh U. S. Cavalry, Professor of Military Science and Tactics,	———
John D. Walters, M. Sc., Instructor in Industrial Drawing	1,100
William H Cowles, A. B., Instructor in English and History, Librarian	1,100
Ira D. Graham, B. Sc., Superintendent of Telegraphy, Secretary	1,200
George F. Thompson, Superintendent of Printing	800
Mrs. Nellie S. Kedzie, M. Sc., Teacher of Household Economy and Hygiene	800
Timothy T. Hawkes, Superintendent of Workshops	900
Mrs. Elida E. Winchip, Superintendent of Sewing	*b* 450
William L. Hofer, Teacher of Music	*c* 500
Julius T. Willard, B. Sc., Assistant in Chemistry	600
Jacob Lund, B. Sc., Foreman of Iron Shops	*b* 450

a And house rent. *b* For nine months. *c* And fees from instrumental music.

The subordinate officers in the various departments are as follows:

E. Winne, Engineer and Janitor	*a* $50 per month.
Warren Whitney, Foreman of Farm	*b* 50 per month.
W. Baxter, Gardener	*b* 40 per month.

a And house rent and fuel. *b* And house rent.

Two teamsters are paid an average of $20 per month and board.

All the rest of the work upon the farm and grounds, and in the buildings, is done by students, upon an average monthly pay-roll of about $300.

The Board have thought fit to relieve the President of the College of some details of accounts heretofore belonging to his duties as Secretary of the Board, by appointing Mr. I. D. Graham, who has long rendered faithful service in the President's office, Assistant Secretary, in which capacity he will have direct responsibility for the College accounts.

APPROPRIATIONS.

Of the $20,000 appropriated by the last Legislature for completing the main college building, $15,000 was not available till July 1, 1884. The building is all under contract, including steam-heating apparatus; the outer walls are up, and the whole will be ready for use in autumn. The contract for stone work was let to Jacob Winne, of Manhattan, for $6,500; that for the rest of the work to J. O. Nichols, of Atchison, for $10,869.85; that for steam-heating apparatus to McCarthy & Sheahan, of Topeka, for $2,389

—the lowest bidders in each instance. The appropriation of $2,500 for a green-house was very economically expended in the construction of three rooms for plants and a potting room, heated by hot water. The space under glass, and now filled with growing plants of many varieties, is over 2,100 square feet. The house was occupied in November, 1883, and has unquestionably proved a most valuable addition to the working machinery of the College. The $500 appropriated annually for general repairs of buildings has scarcely been sufficient to meet the actual demands; but, by addition of amounts received for rent of rooms, etc., has kept the buildings in fair condition. A somewhat larger sum will be required in the next two years.

The appropriation of $1,000 in 1882–3, and $500 in 1883–4, for increase of the library, has been economically expended, as shown in the annual reports of the Librarian, and there is now a well-selected library of over 5,000 volumes carefully arranged and catalogued. The wants of such a growing institution in this respect, however, more than keep up with this general growth, and a liberal provision is needed in the next two years.

The special appropriation for farm stock, experiment, etc., of $500 each year, has served its proper purpose, as shown in the report of the Professor of Agriculture, and more particularly presented in a special report of forty-eight pages published by the College in April last and included with the general reports of departments herewith presented. The very general interest taken in the results of such experiments warrants a fuller provision for similar work in the next two years, both in proper buildings and apparatus, and in funds for meeting the necessary expenses.

THE ENDOWMENT.

Under an act of the Legislature approved March 6th, 1883, the endowment fund of the College was transferred to the State treasury. It amounted at the time, to $394,076.67, of which $293,700.66 was invested in State bonds; $93,853.67 was in part-paid land contracts, and $6,522.34 was cash awaiting investment. All but $274.62 of an unsettled account has been put into the hands of the State Treasurer, through whom all collections and disbursements have been made. The fund has since increased through the sale of lands, and on June 30th amounted to $474,305.18, of which all but $8,111.90 was invested at rates varying from 6 to 10 per cent. The uninvested balance is larger at the above date than at any other time of year, from the fact that most school bonds are made payable July 1st, and payments are made in anticipation of that date faster than investments can be found. The reports of the Secretary show the actual balance uninvested for each month in the year.

In the management of so large a fund during a series of years, some expenses must be incurred and occasional losses must be provided for. The act of Congress approved July 2d, 1862, under which this fund was placed in charge of the State for the maintenance of the College, provides as follows:

"SEC. 3. That all the expense of management, superintendence and taxes from date of selection of said land, previous to their sales, and all the expenses incurred in the management and disbursement of the money which may be received therefrom, shall be paid by the State to which they may belong, out of the treasury of said State."

And further:

"SEC. 5. *First:* If any portion of the fund to be invested, as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs so that the capital of the fund *remain forever undiminished* to the purposes mentioned in section 4 of this act.

"*Second:* No portion of said fund, *nor the interest thereon,* shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings."

By joint resolution of the Legislature, approved February 3d, 1863, these conditions and provisos were accepted, stating in express terms, "The State hereby agrees and obligates itself to comply with all the provisions of said act." In fulfillment of our part in this contract it becomes our duty to present for the proper consideration of the Legislature a statement of such expenses and losses as yet unpaid by the State.

The report of Regents for the years 1881–2 enumerated with full explanations a loss of $700 principal and $415 interest, and expenses of litigation $1,162.21, none of which has yet been provided for.

In the two years ending June 30th, 1884, the College has met with the loss of a farm in Jackson county, received in settlement of a loan as early as 1875, and sold in 1879 upon contract to F. Purcell, of Holton, Jackson county. A flaw in the title of the College having been established in the courts, it became necessary, in order to fulfill the contract with the present occupant, to purchase the farm at a price, including the cost of court and transfers, of $2,376.23, $400 of which is covered by a note of the present purchaser voluntarily given as a share in the loss. The State should make good the remainder, $1,976.23, to the College funds.

A further loss of $15, with $35 attorney's fee, in an injunction suit to prevent collection upon a bond of District 52, Marshall county, in which through mismanagement of the county superintendent, the district failed to receive the money, completes the list of losses.

The judgments obtained against districts in Stafford county once supposed to be in Barton county, and reported two years ago, are still unpaid, and every effort is being made by the districts to gain a settlement by compromise in which case a small loss will have to be met, and may be reached before the next session of the Legislature.

The extra meetings of the Board of Regents made necessary by the transfer of funds to the State treasury and final settlement with the former Treasurer and Land Agent, brought the total expenses of the year ending June 30, 1883, in excess of the appropriation. The College Treasurer, therefore, holds vouchers to the amount of $221.40, returned by the State Auditor for want of funds. This slight excess is partially compensated by the amount left undrawn from the treasury in the year just closed.

The Board have paid to the Loan Commissioner a small salary of three hundred dollars a year, which compensation should be provided by the State under the terms of law above quoted. All these expenses and losses have been temporarily met from the College treasury.

INCOME FUND.

This fund has increased with the growth of the funds invested, but not quite in proportion, as the current rates of interest are less than heretofore. The average rate upon all investments June 30, 1884, is 7½ per cent., and gradually diminishing as the ten-per-cent. securities give place to six-per-cents. The total from investments has been, for the year ending June 30, 1883, $31,750.53; for 1884, $32,637.78. The surplus has been somewhat diminished by the meeting of losses and extra expenses named above; but now amounts to $11,837.68, much of which has been invested during a large portion of the year.

The last report showed 15,741.72 acres of land yet unsold. Most of this has been sold at prices considerably higher than in previous years, the Board having twice advanced the prices twenty per cent. There remained June 30, only 2,793.02 acres unsold, all of which is likely to be marketed before the first of January.

The efforts through Hon. S. J. Crawford to secure from the General Government 7,686.47 acres lacking from the 90,000 granted, have not yet proved successful; but a bill is now before Congress which seems likely to settle the question in favor of the State.

BUILDINGS.

Under the provisions of law already quoted, it becomes necessary that the State should provide such buildings as may be needed for the constant growth of the College.

The Department of Natural History has been but temporarily provided for as yet in any of the buildings. It seems wise to put to such use the upper story of the building known as Armory Hall, in which there is ample room for the needed museum and class-room. To properly finish and furnish this building will cost $3,000, but will make an excellent use of a costly building now poorly adapted to any college purposes.

The roof of the north wing of College Hall, built in 1878, is of shingles, and is fast giving way. It should be renewed with slate to correspond with the rest of building, before any serious damage to the valuable contents can be occasioned by the leaks already opening.

Horticultural Hall is provided with a good class-room and cabinet room, but lacks a proper store-room and office. A suitable addition can be made to this at a cost of $600.

The main building, including the chapel, is fitted for lighting by gas, but no sufficient provision for a gas machine has yet been made. One of sufficient capacity could be purchased for $750.

It seems very desirable, both for convenience and safety, to provide for heating the chemical laboratory by steam. The economy in fuel and care, with the added comfort and efficiency of the laboratory, fully guarantee an appropriation for this purpose of $1,500.

General repairs of College buildings and furniture, including kalsomining, painting and slight improvements, cannot be less than $700 a year.

The need of dwellings on the College grounds for those directly responsible for oversight of the whole has been referred to in former reports. As the interests become more varied and extended the need is more apparent. So much of general supervision at all hours is required of the President and the Professors of Agriculture and Horticulture, that true economy requires them to live on the premises. One old house (stone), which has been temporarily fitted up and is now occupied by the President, is the only structure at all available for a residence. Two others are greatly needed, one of which should be centrally located and suited to the wants of the President, who must frequently entertain guests of the College, and one should be convenient to the extensive gardens and orchards for the superintendent of that department. These, with suitable outbuildings, will cost $12,000.

The commodious stone barn, erected in 1877, is barely sufficient for the present stock, without room for any experimental work. For this a temporary shed has been used, but it is very unsatisfactory. A good barn, expressly contrived for accurate experiments in stock feeding and storage of experimental grains and seeds, is needed. It will cost $4,500, at present prices. A good corn crib worth $500, and a cattle shed worth $600, are also much needed.

The proposition, now pending in Congress, to provide a fund for extensive experiments in connection with each State agricultural college which is in condition to undertake the task, is of special interest to this State where so much of new matter can be investigated. If the preparations now asked can be made at once, the national appropriation, if made, will place this State among the chief in this line, as it now is in the provision for agricultural education.

The Board would call attention to the series of Farmers' Institutes held annually in different counties of the State. The interest in these has increased from their beginning in 1881. Limited to six each winter, from the impossibility of taking professors from their classes oftener, they have nevertheless been of great use to the State. The expenses of the Faculty in attending these have been paid from the College funds, but it seems wholly proper that a small appropriation should be made for a purpose so directly useful to the State at large, and not contemplated in the original grant to the College. The annual cost has been about $300.

The act of Congress by which the College is endowed, requires the publication of an annual report which shall be distributed to all similar colleges in the country. The Board have required annual reports from all the officers, but no provision has been made for publication. Would it not be proper to provide for the publication of such reports, including the records of experiments in the different departments each year? The Board have felt so earnestly the need of such reports that 5,000 copies of a pamphlet detailing farm experiments were printed on the College press and distributed this year.

The need of a larger farm for experimental and illustrative purposes is constantly felt, and has been referred to in former reports. Some adequate provision in legislation is needed immediately, that the opportunity to enlarge by purchase may not be lost for all time. The Board cannot act in this matter without authority from the Legislature, and would probably need an appropriation for that purpose.

Appended are full reports of officers, showing the condition of the College in all particulars. With the hope that it may be found satisfactory, all is respectfully submitted.

F. D. Coburn, Wyandotte,
President.
C. E. Gifford, Clay Center,
Vice President.
J. T. Ellicott, Manhattan,
Treasurer.
H. C. Kellerman, Burlington.
Philip Krohn, Atchison.
C. A. Leland, El Dorado.
G. T. Fairchild, (*ex officio,*)
Secretary.

ESTIMATES FOR 1884–6.

The following summary of wants fully explained in the foregoing pages, and unprovided for unless the State makes appropriations therefor, is appended for convenience of reference:

	1885–6.	*1886–7.*
Refunding losses and expenses	$4,834 84	....
Finishing museum building	....	$3,000 00
Repairs, general and special	700 00	1,400 00
Horticultural office	600 00	....
Experimental barn	4,500 00	....
Corn-crib and cattle shed	....	1,100 00
Dwellings and outbuildings	8,000 00	4,000 00
Gas machine for College Hall	750 00	....
Steam heat for chemical laboratory	1,500 00	....
Library increase	1,000 00	1,000 00
Farm experiments	500 00	500 00
Farmers' Institutes	300 00	300 00
Loan Commissioner	300 00	300 00
Total	$23,074 84	$11,600 00

REPORT OF THE PRESIDENT, 1882–83.

To the Board of Regents:

GENTLEMEN — In presenting an official report of the general college work for the year ending June 30th, 1883, I cannot but congratulate all interested in the growth of the College upon the steady advancement made in every direction. While more than the usual anxieties and burdens have been met, the results on the whole surpass expectations.

The year began with the hurry and worry of finishing the new building, when all the work was delayed beyond the opening of the College year, and many details of the work were under the direct charge of the President. The selection and purchase of furniture, and general repairs of buildings and fittings of library and reading room also fell under his oversight and direction. At the same time anxiety as to the financial ability of one of the contractors became a serious burden.

The sudden death of Mr. E. Hunting, for four years the faithful janitor of the buildings, made the executive duties heavier from the wholly inexperienced help that must be substituted. Mr. M. Jenkins, a former student, undertook the work of janitor on the first of September, but with no experience of such cares; and all the minutiæ of details must be looked after from the President's office.

Mr. T. T. Hawkes, for four years the efficient Superintendent of the Mechanical Department, resigned on the first of September, and Mr. M. A. Reeve was made Acting Superintendent under the especial direction of the President. While there was no lack of efficiency in this department, the responsibility of the executive was greatly increased.

The retirement of Mrs. M. E. Cripps, after some six years' experience in the Department of Household Economy and Sewing, brought new anxieties for the successful inauguration of Mrs. Nellie S. Kedzie, a graduate of this College in 1876. All anxiety, however, was soon dispelled by the prosperity of the department under its new Superintendent.

Mr. W. H. Cowles, a recent graduate of Oberlin College, entered upon his work as Instructor in English and History with the opening of the college year, and at once took his full share of teaching, with the added cares of Librarian. His work has been excellent from the beginning.

The other departments of college work have been under the same experienced hands, and have made the usual progress, as shown in the respective reports presented. All show better equipment and better teaching than in any previous year.

Noticeable increase of apparatus is seen in the Department of Engineering and Physics; while the addition of $1,000 worth of books to the library, with entirely new and more convenient arrangement upon shelves, has made this a more attractive and efficient aid to study. The former office of the

President is now the general reading room, well supplied with periodicals of all classes.

The grounds in front of the main building have been graded and seeded, and to some extent planted with trees. The new drive, planned and laid out by myself, has been graded and graveled; and the new gateway, with a very fine self-opening gate, manufactured by D. E. McSherry & Co., of Dayton, Ohio, admits to the premises. The old lane has been entirely removed, and the general appearance of the grounds is improved by a very neat wire fence, separating the lawns from the farm fields.

The fitting-up of the new offices for the President and Secretary, with the arrangement of all the College papers in file boxes for ready reference, has been completed, and the vault, essentially fire-proof, now contains as nearly complete records of College affairs as can be gathered. Full sets of the catalogues, the annual reports, and the *Industrialist*, are preserved there, as well as all the written records of the past twenty years. While the new arrangement has greatly increased the facilities for business in the office, the necessary care in arranging and gaining familiarity with the new places has been very considerable.

The preparation of copy for the biennial report of the Regents to the Legislature naturally fell to my charge; and as this was the first in which the complete accounts of a Secretary of the Board appear, my duties in this particular were onerous. But for the efficient help of Mr. I. D. Graham, Superintendent of Telegraphy, they must have been still heavier.

Questions as to the financial condition of the College, called out by the Governor's message before the report was printed, made additional labor to extend the report to December 31, 1882, and I was called upon to lay full information before the Governor.

The presentation of College necessities in the shape of buildings and improvements before the Legislative committees was left almost wholly to myself, from the fact that with the new administration an entire new Board of Regents, wholly unacquainted with the workings of the College, came into control. The Legislature responded liberally to the needs of the College for completing the main building, erecting a greenhouse, and maintaining the buildings in repair; also for the growth of the library, and for special farm experiments. Probably for the reasons above mentioned, no provision was made for restoring to the funds of the College, money used in caring for the lands and funds, as provided in the organic act. The transfer of the funds from the financial office of the College to the State treasury, and the subseqent change of officers, have materially added to the duties of the executive. Having acted as Secretary for several years, the general system of accounts has been of my devising, and the new arrangement much increased the needed accounts in this office. It is possible now to know the condition of every fund, and of every department, as well as of every school bond or land contract, without leaving the office or adding to the daily machinery of the office.

In spite of these extra burdens, not to mention other distractions appearing near the close of the year in the retirement of long-tried and faithful members of the Faculty, to give place to less-known and untried professors, the year has been one of very gratifying growth. All the departments have shown marked improvements in both attendance and work accomplished. The daily exercises in the new chapel, so admirably contrived for such purposes, have been regularly attended by both Faculty and students, Professors Ward and Platt and myself leading in rotation. The regular monthly lectures before the students have been as follows: Birds, Prof. Popenoe; Australia, Prof. Platt; Life at West Point, Prof. Todd; Raphael, Prof. Walters; Reading, Prof. Cowles; Revelations of the Microscope, Superintendent Graham; Sketch of Journalism, Superintendent Thompson; Politeness, President Fairchild.

The students' societies and prayer meetings have had increased attendance and usefulness in their new quarters, and the social entertainment of each term, accommodated so pleasantly in the new chapel, halls and reception rooms, has gained in attractions and advantages. The committee of the Faculty in charge propose another year to add occasional evening lectures by distinguished men of the State. The new chapel has also given an excellent stimulus to the public rhetorical exercises, at which students of the fourth year present original, and those of the third year selected, declamations. All classes have had their regular drill in elocution and essay writing under their several instructors, report of which, with that of all other exercises, will be found in the several reports of professors and superintendents.

Several of the advanced students have been employed, as need required, as assistants and foremen. Mr. J. T. Willard, of the graduating class, has assisted Prof. Failyer in chemistry during the entire year at merely nominal wages, and I am glad to feel that his efficient service is recognized by appointment to the position of assistant chemist for the year to come. With each year increasing labors come to that department.

During the winter term of the past year, it became necessary to employ an extra teacher for a single class in arithmetic, and Mr. J. D. Needham, of the graduating class, was employed to general satisfaction. Mr. J. Lund has acted as foreman of the blacksmith shop during the most of the year in place of Mr. J. Linder, who was called to the railroad shops. Other students have done excellent service in various departments as special assistants, and the general labor system has been admirable. The monthly payroll to students has averaged over $200.

The teaching of music, both vocal and instrumental, has remained as heretofore a matter of personal arrangement with the professors in charge. The College has, however, provided an additional instrument and put in better order the old ones. As the attendance and culture of students both increase, the needs of this department become more pressing, and the rooms now available will soon be inadequate.

The general discipline of the College has been, as usual, without friction. No case of discipline has come before the regular weekly Faculty meeting outside the attention required by the few dilatory students who enter each term and fall out by the way for want of application. The maxim of the College has long been, "Attend to business, or leave," and a few have yielded to its application on failure in studies.

The attendance of the year has been considerably increased over previous years, so that the additional instructor provided has really given no relief to overworked teachers. The whole number of students enrolled has been 347, 233 males and 114 females. These were classified as follows: fourth year 12, third year 30, second year 60, first year 241, special 4; and represented different parts of this State and other States as shown in the following list of counties and States, with the number from each.

COUNTIES OF KANSAS.

Anderson	2	Franklin	7	Ottawa	14
Atchison	4	Ford	1	Osage	6
Butler	1	Greenwood	2	Osborne	2
Brown	6	Harvey	2	Phillips	1
Barton	4	Jewell	10	Pottawatomie	12
Clay	23	Jefferson	2	Riley	100
Chautauqua	3	Jackson	2	Reno	1
Coffey	3	Johnson	2	Saline	1
Cloud	8	Leavenworth	4	Sedgwick	3
Cherokee	3	Labette	3	Stafford	1
Cowley	1	Lincoln	1	Shawnee	13
Chase	2	Marshall	5	Trego	2
Doniphan	1	Mitchell	4	Wabaunsee	14
Davis	15	McPherson	2	Washington	2
Dickinson	4	Marion	1	Wyandotte	1
Decatur	1	Morris	1		
Elk	6	Nemaha	1	Total	320
Ellsworth	1				

OTHER STATES.

Arkansas	1	Missouri	4	Pennsylvania	1
Colorado	1	Nebraska	1	Rhode Island	1
Indiana	1	New Mexico	5	Wisconsin	1
Illinois	1	New York	2		
Iowa	5	Ohio	3	Total	27

The average age of students for the year shows a slight diminution from that of 1881–82, but maintains essentially the average of the past four years. It is 18.81 years.

The following students, twelve in number, completed the four-years course, and received at Commencement, June 13th, the degree of Bachelor of Science:

James W. Berry	Jewell City, Jewell.
Mary C. Bower	Manhattan, Riley.
Lewis W. Call	Wild Cat, Riley.
Emma Glossop	Manhattan, Riley.
William J. Griffing	Manhattan, Riley.
Phœbe E. Haines	Manhattan, Riley.
Hortense L. Houston	Manhattan, Riley.
Jacob Lund	Alma, Wabaunsee.
Katie I. Meguire	Manhattan, Riley.
J. Dana Needham	Lane, Franklin.
Milan T. Ward	Orion, Henry Co., Illinois.
Julius T. Willard	Wabaunsee, Wabaunsee.

All presented graduating orations before an audience of 750 people, gathered in the commodious new chapel. At the same time and place, Miss Alice E. Stewart, class '75, and Mrs. Nellie Sawyer Kedzie, class '76, presented Masters' orations, and received the second degree in course, Miss Stewart being admitted to the degree of M. A., and Mrs. Kedzie to that of M. S.

Prof. J. D. Walters, long and favorably known for his proficiency and enthusiasm in industrial education, especially industrial art, upon unanimous recommendation of the Faculty received the honorary degree of Master of Science.

The total number of graduates is now eighty-five, thirty-four of whom are women. Forty-five have graduated in the last five years. Since my connection with the College, the graduating classes have been seven, eight, nine, and twelve. The next year's class promises a larger increase still.

The Farmers' Institutes, attended by seven members of the Faculty, three going to each, were held during the months of January and February in the following places, with satisfactory results in all:

Belleville, Republic county.
Mankato, Jewell county.
Hiawatha, Brown county.
Edgerton, Johnson county.
Columbus, Cherokee county.

The prospect for future work in this direction is decidedly encouraging, the demand being likely to outgrow the supply with very little effort on the part of the College authorities. My share of the work, aside from a general correspondence in its behalf, was confined to two institutes.

General duties at the College have been so much more confining than usual that efforts elsewhere have been limited. A brief paper on "Dexterity Before Skill in Industrial Education" I had the pleasure of presenting before the National Teachers' Association meeting in Saratoga, N. Y., last July. The usual work of the State Board of Education has had my careful attention as needed, and the columns of the *Industrialist* have had frequent contributions from my pen, though I have been relieved from the regular turn in editorial work. The annual baccalaureate sermon was given by myself with the feeling that it should, if possible, embody the parting lessons of earnestness inspired by the acquaintance of years during student-life. The correspondence of the office has greatly increased with the growth of the College, and is likely to gain still further as the prestige of the institution reaches a wider circle. Letters are received daily, almost, from all parts of the State, and from other States, concerning matters of general information. When these pertain to the specialty of any professor, they are referred to him for answer; but most of them involve an answer from this office. It seems desirable that the duties of President and Secretary be separated as soon as proper provision for a competent Secretary can be made. Superintendent Graham would be able to carry the work forward to the advantage of the College could he be relieved of almost constant teaching in telegraphy.

The generous provision of the Board for a tour of visitation to several colleges and the National Teachers' Association at Saratoga, gave opportunities for comparison and growth most highly prized, and of no little advantage indirectly to the College. In many respects this College can compare favorably with much older institutions.

My classes have been the same as in previous years, viz., the fourth-year students in psychology, logic, U. S. constitution and political economy. The necessary arrangement of these studies in the course brings two classes to my charge in the spring term, when the closing year has increasing burdens of executive duties. I have thought it desirable, as soon as we have force enough, to transfer the U. S. constitution to the Department of English and History.

The financial matters under my direct control embrace all expenditures on buildings and grounds and for general machinery of the College, and cover the general expenses in maintaining a property amounting to $98,322.40, as just inventoried. The expenditures were directly $5,890.58, and through other departments $31,998.18; total, $37,888.75, distributed as follows:

OFFICE.		
Postage	$252 31	
Stationery	56 80	
Traveling expenses	225 00	
		$534 11
JANITOR, ETC.		
Wages and help	$840 63	
Fuel	1,183 62	
Lights	28 75	
Implements	35 60	
		2,088 60
BUILDINGS.		
Repairs	$653 16	
Improvements	311 97	
Gas fixtures	280 10	
Furniture	1,001 61	
		2,246 84
GROUNDS.		
Care	$148 43	
Improvement	923 98	
		1,072 41
GENERAL COLLEGE.		
Incidentals	$379 63	
State fair	72 80	
Farmers' Institutes	170 80	
Board meetings	26 00	
Annual catalogue	170 00	
Advertising	235 50	
		1,054 53
New building, transfer		29,179 38
Land in Shawnee county		1,712 78
Total		$37,888 65
RECEIPTS.		
Rents	$221 75	
Sales of fuel, etc	22 05	
		$243 80

The increase of inventory in this department is $32,267.17, all of which is embraced in the buildings, furniture and grounds.

In conclusion, I can but commend to your attention the uniform progress of the last few years as shown in the report, and the still brighter prospects

before with the added facilities and accommodations now within our reach A united Faculty and a zealous Board of Regents cannot but insure prosperity. Respectfully submitted. GEO. T. FAIRCHILD,
President.

REPORT OF THE PRESIDENT, 1883–84.

To the Board of Regents:

GENTLEMEN — The annual report of general growth and management of College interests for the year ending June 30th, 1884, is presented with gratification in the progress shown in material interests, and in the satisfactory results obtained in all departments. Full reports of these departments in detail being presented by the officers in charge, I need only to present the more general view given from my office.

The opening of the year found three new professors in the chairs assigned them by the Board. Prof. W. A. Kellerman, formerly of Oshkosh, Wis., and more recently of the Agricultural and Mechanical College of Kentucky, was called to the new chair of botany and zoölogy, made by relieving several professorships of extra duties, and separating the botany from horticulture. Prof. B. F. Nihart, of Atchison, became Professor of Mechanics and Engineering, and Prof. D. E. Lantz, of Manhattan, was given the chair of pure mathematics. All have taken hold of their new work with zeal, and have shared in the general duties of the Faculty in full sympathy with the work.

The regular weekly Faculty meetings have shown marked unanimity and unusual interest of all in the growth of each department. The general discipline has been excellent, both in class-rooms and halls, and in general conduct outside of college hours. Not a single serious breach of good order or general decorum has been known; and the cases of failure in studies from slackness in general habits have been very few. Several have been dropped from classes for incapacity, but fewer than usual; and yet the general standard of scholarship has been slightly raised.

The increased attendance has made necessary the employment of extra help during the winter term, and two classes of a grade below the regular first year have been taught by advanced students. This grade of classes is not included in the regular course, but is made necessary each year from the number of young men and women of eighteen or more years who have lacked advantages of good common schools and are therefore deficient in one or more studies. To most of these, their only opportunity for any schooling must come from some such provision. These are all catalogued as first-year students, though not fully up to the required standard. These classes have numbered about 70, a larger number than for some years past.

The usual provision for general exercises has been made, with the addition of two evening lectures by eminent men of the State. Once in four weeks, members of the third and fourth-year classes have presented orations or declamations before students and Faculty. Once a month, a member of the Faculty has given a public lecture in the chapel. The following is the course of the year past:

Color	Mrs. Kedzie.
Learning to See	Pres. Fairchild.
Pasteur	Prof. Kellerman.
Growth and Reform	Prof. Shelton.
Sculpture	Prof. Walters.
Lord Lawrence	Lieut. Todd.
Photography	Prof. Failyer.
Too Much and Too Little	Prof. Nihart.

The evening lectures were: "The Struggle for Life," by Pres. A. R. Taylor, of the State Normal School; and "The Other Life," by Dr. Philip Krohn, of Atchison, a Regent of this College.

The usual social and literary entertainment, held once each term in the main College building, has met with more than usual success under the charge of a committee of the Faculty. The two literary societies have each given a public exhibition and a special address in the chapel, besides keeping up excellent weekly work. The addresses were given by Prof. Failyer for the Alpha Beta Society, and by Lieut. Todd for the Webster Society.

The meetings of the Scientific Club on the first Friday of each month have been well attended, and have, to some extent, engaged the efforts of older students in researches of general interest. The collections of this society have been placed in the general museums, with due credit to the society.

The weekly college prayer-meeting has been attended with marked interest by from fifty to eighty students, being led by some member of the Faculty. The daily chapel service has been attended regularly by most of the Faculty, the exercises being led by Profs. Nihart, Lantz, Cowles and myself, in rotation. The students are required to be present unless excused by the President; and the gathering is made the occasion of many brief talks upon matters of concern to students in studies, general conduct, good manners and good morals.

The number of students enrolled during the year is 395, not counting 19 applicants who, for lack of advancement, failed to enter classes. These were classified as follows: Resident graduates, 2; fourth year, 18; third year, 26; second year, 92; and first year, 255; special, 2. The young women numbered 135 of the 395, the usual one-third of many years past, and have done their full share of work and study with ease, although somewhat younger, as a rule, than the young men. The average age of all is greater this year than last, and above the general average, being 19.09 years, as given at the date of admission.

The gradual increase in attendance and maturity since the College was established in its present location may be of interest:

Year.	*Attendance.*	*Age.*
1875–76	....	18.30
1876–77	....	18.12
1877–78	150	18.16
1878–79	207	18.61
1879–80	276	18.80
1880–81	267	18.84
1881–82	312	19.35
1882–83	347	18.81
1883–84	395	19.09

The whole number of students connected with the College since its opening in 1863 is 2,369 — 1,579 young men and 786 young women — three-fourths of whom have come from farmers' homes and gone back to the same kind of life with added intelligence and energy.

The different counties of this State and other States represented the past year are as follows:

COUNTIES OF KANSAS.

Allen	3	Franklin	6	Ottawa	12
Atchison	4	Harvey	2	Pawnee	1
Barton	1	Jackson	2	Phillips	2
Bourbon	2	Jefferson	6	Pottawatomie	16
Butler	1	Jewell	8	Reno	4
Chase	5	Johnson	8	Republic	2
Chautauqua	3	Leavenworth	1	Rice	3
Cherokee	3	Linn	1	Riley	112
Clay	26	Lyon	3	Saline	3
Cloud	3	Marshall	6	Sedgwick	2
Coffey	2	McPherson	5	Shawnee	11
Cowley	9	Miami	1	Sumner	6
Davis	16	Mitchell	3	Trego	3
Decatur	1	Montgomery	2	Wabaunsee	17
Dickinson	6	Morris	8	Washington	2
Doniphan	1	Nemaha	4	Wilson	3
Douglas	2	Osage	6	Woodson	1
Elk	1	Osborne	7	Wyandotte	2
Ellsworth	1				

OTHER STATES.

England	4	Missouri	5	Ohio	1
Illinois	1	Nebraska	4	Pennsylvania	2
Indiana	1	New Mexico	2	Rhode Island	1
Iowa	3				

The graduating class of this year numbers seventeen, of whom but four were ladies. Their names and residences are as follows:

Emert S. Andress	Hanover, Washington county.
Florence J. Brous	Manhattan, Riley county.
Bartholomew Buchli	Alma, Wabaunsee county.
John H. Calvin	Manhattan, Riley county.
William A. Corey	Topeka, Shawnee county.
Henry M. Cottrell	Wabaunsee, Wabaunsee county.
Carrie F. Donaldson	Manhattan, Riley county.
Florence A. Donaldson	Manhattan, Riley county.
Frank W. Dunn	Goshen, Elkhart county, Ind.
I. Day Gardiner	Eskridge, Wabaunsee county.
Edwin H. Kern	Iona, Jewell county.
Marion M. Lewis	Stockdale, Riley county.
Charles L. Marlatt	Manhattan, Riley county.
Lincoln H. Neiswender	Silver Lake, Shawnee county.
George C. Peck	Junction City, Davis county.
Hattie L. Peck	Junction City, Davis county.
John W. Shartel	Wauneta, Chautauqua county.

All presented orations and received the degree of Bachelor of Science. No other degrees were conferred. This is the largest class yet graduated, and the class most likely to carry into the leading industries the most of trained energy. The whole number of graduates is now 102, of which 38 are women. The work they are doing in the State and elsewhere will be shown in the catalogue of 1884–5. In any estimate of this good work, it must not be forgotten that almost two-thirds of these young men and women are less than five years out of school, and not yet old enough to have won repute in any calling.

The general health of the students and faculty has been excellent, no very serious illness having occurred, though a number of cases of measles caused the withdrawal of students. A remarkable fact may be noticed, in that no death has occurred among the students for nearly five years.

Seven Farmers' Institutes have been held during the fall and winter months in as many different counties, one being added to supply the lack of one in the previous year. The good results of these are shown in many ways, but especially by the fact that applications for a second in the same locality are frequent. The following places were selected last year, and three or more members of the Faculty attended each:

Burlingame, Osage county; Osborne, Osborne county; Nortonville, Jefferson county; Effingham, Atchison county; Olathe, Johnson county; Sterling, Rice county; Garden City, Finney county.

My own share in this work was confined to the institutes at Osborne and Garden City, in both of which I gave an evening address upon "Work and Wisdom."

Of general work outside of college cares, I have done very little. The routine of office work and correspondence has left neither time nor strength for outside lecturing or writing for periodicals, to both of which I am often urged. It may be that the relief proposed in the appointment of Mr. I. D. Graham Assistant Secretary of the Board, may enable me to do more of such work for the College in future. I have given a brief address at the county fair in Butler county, and have preached an occasional sermon during the year, but have declined all other invitations. My usual duties in connection with the State Board of Education have been attendance upon five meetings, besides the annual examination and the State Teachers' Association. I am grateful for the opportunity given me to meet with the National Educational Association in July, and to visit other colleges on the way.

The routine work of the office, with so large an increase of numbers and machinery, has been increasing; but the facilities added from time to time, and the efficient assistance rendered by Secretary Graham, have prevented its being burdensome. Some extra expense has been incurred by the increased help required to keep all records and attend promptly to so large a correspondence as the College now maintains. Two editions of ten thousand copies of the *Industrialist* have been carefully distributed over the State, chiefly in single copies to individuals, or in packages to persons directly interested in their distribution. Over 4,000 copies of the annual Catalogue have been distributed.

My classes have been, as usual, the psychology, logic, and political economy, of the fourth-year class, numbering, for most of the year, eighteen students. The U. S. constitution, heretofore under my charge, has been taken by Prof. Shelton. In my teaching, text-books have been used, with occasional lectures upon points not fully presented in the books. Among these have been prominent a course of four weeks in practical ethics, especially personal rights and duties.

The annual baccalaureate sermon was given June 8th, according to custom here, by myself, and has been published in the *Industrialist.* The annual address was given, upon the invitation of the Board, by Hon. Geo. R. Peck, of Topeka, and was entitled, "The Conflict of Social Forces." The address was printed in one of the large editions of the *Industrialist*, and also in a neat pamphlet, and so distributed through the State.

The general charge of buildings and furniture has been shared with me by Supt. Hawkes, but very many details have fallen necessarily under my direct supervision. With most efficient help, however, in the new janitor, Mr. Ernest Winne, this burden has been comparatively lightened. The financial statement shows somewhat the extent of interests under the direct charge of the Executive.

The total inventory of the department, including all building and furniture used for general purposes, as shown in the report of the Secretary, is $99,677.92. The expenditures for all purposes have been $7,072.18, of which amount, $1,649.96 has been through other departments. The following summary shows the direction of—

EXPENDITURES.

OFFICE.		
Postage	$309 35	
Stationery	44 97	
Furniture	69 85	$424 17
CARE OF BUILDINGS, ETC.		
Labor	$1,012 79	
Fuel	1,450 60	
Lights	26 30	
Implements	100 42	2,590 11
BUILDINGS.		
Repairs	$543 19	
Improvements	1,357 80	1,900 99
GROUNDS.		
Care	$102 47	
Improvement	521 84	624 31
CLASS-ROOMS.		
Furniture	$110 75	
Incidental	130 25	241 00
SUNDRIES.		
Catalogue	$248 75	
Advertising	468 95	
Institutes	237 05	
Clerical work	36 65	
Legal advice	25 00	
Lectures	20 56	
Taxes (refunded)	16 10	
Expenses at Board of Education	26 62	
Rent (gardener)	46 67	
Carriage for Regents	39 00	
		1,165 35
Total		$6,945 93

RECEIPTS.

Rent of buildings	$372 25	
Sales of fuel	73 59	
Refunded taxes	15 21	
		$461 05
Bills against departments		149 43
Total		$610 48

In concluding this report, I cannot refrain from congratulating the Board upon the year's work in all departments. The name of this College stands high in the list of agricultural colleges throughout the country, as accomplishing the object of such institutions more perfectly than most of them. It has been visited by several noted students of such methods of education, and is highly commended by all. There seems to be needed for its still greater advancement, only such provision for growth and stable government as a State so thrifty as ours will be sure to provide.

Respectfully submitted.

GEO. T. FAIRCHILD.

REPORT OF THE PROFESSOR OF MATHEMATICS, 1882–83.

To the Board of Regents:

GENTLEMEN — At the opening of the collegiate year closing June 30th, 1883, in response to a request often repeated, I was relieved of the duties of College Librarian, and also of my class in English. Called to the chair of mathematics in this institution ten years ago, this is the first year during which my regular daily classes have been in mathematics only. It is needless to say that the change has been appreciated.

During the year my classes have been in the branches of mathematics as they occur in the course. In the fall term the class in algebra numbered sixty-two; of them, forty were males and twenty-two females. At the close fifty-eight were examined. The class was taught in two sections.

The class in trigonometry and surveying numbered thirty, of whom eighteen were males and twelve females. At the close of the term, twenty-five passed the examination.

During the winter term, the class in geometry numbered fifty; males thirty-five, females fifteen. It was divided into two sections. Examined at the close of the term forty-two.

The class in mechanics numbered twenty-one; males fifteen, females six. All were examined at the close of the term.

During the spring term, the class in algebra (first-year students) numbered seventy-nine; males forty-nine, females thirty. Examined at close of term seventy-three. The class was divided into two sections. The class in geometry, advanced, numbered thirty-one; males twenty-two, females nine. Twenty-eight passed the examination. The class in engineering was composed of nineteen young men, and all were passed at the end of the term. Each member furnished a thesis, which is placed on file in the Department of Mathematics. The classes have been larger than during any preceding year. It will be noticed, however, that as the classes advance there is a great diminution in numbers. Especially is this true of the ladies. Of the last class, only 50 per cent. of the young ladies who studied trigonometry took mechanics.

In former reports I have given the methods of instruction pursued in this department. It has been my aim to present as many different topics as possible in each branch of mathematics studied consistent with thoroughness in what is taken up. In an industrial institution prominence should be given to "mathematics applied" rather than to "mathematics pure." In our short course, only enough of the latter can be given to make a substantial basis for the former.

To the mathematician there is a temptation to linger in the higher regions of mathematical abstractions. It requires self-denial to come down to the dusty arena of practical mathematics. An architect may delight to contemplate the perfect proportions of a stately edifice, which as yet exists only in his mind. Before it becomes a thing of practical use, he must spend days of toil drawing plans and writing out specifications. One may be proficient in trigonometrical analysis, and familiar with the processes of the calculus, and yet not be able to survey a city lot or to locate a railroad curve. But to make a course in the higher mathematics in this institution practical, time must be given for practice, both in the field and in the draughting-room. This work should be done under the direction of a teacher. Until the past year, the time which I could otherwise have given to my classes in field work was required for classes in English. Still, students in surveying and engineering obtained considerable practice by working afternoons and Saturdays.

But the change that was made at the commencement of the year, requiring the young men of the third-year class to take farming as an industrial during the same term they took surveying, prevented my last class from doing as much field-work as former classes have done, two afternoons of each week being given to work on the farm or in the orchards.

For the benefit of future classes, I recommend changes as follows: Let the course in geometry be divided so that trigonometry can be taken the last five weeks of the second year. Mechanics could follow trigonometry, and be taken the first term of third year, when farming is required as an industrial. The remaining two terms of the third year could be divided between surveying and engineering. With a good. handbook on engineering in the hands of each member of the class, supplemented by lectures by the professor and papers by members of the class, the two terms' work could be made very profitable to the young men. During these two terms there seems to me no good reason why draughting and field work should not be counted as industrials for those who desire them.

The department is now well supplied with instruments. An excellent combination transit, with rod, chain, and pins, originally costing $280, was purchased for $180, and a new Vernier compass, costing $50, with the appropriation allowed me.

In addition to my daily classes in mathematics, I have had charge of the rhetorical exercises of the fourth-year class, numbering twelve. On alternate Fridays there were class exercises in the critical reading of Shakspeare. Each member of the class prepared and delivered, under my supervision, three orations during the year.

I attended three of the six Farmers' Institutes at which the College was represented during the last winter.

As Loan Commissioner, I invested for the College during the last year $63,113.

Respectfully submitted.

MANHATTAN, KAS., June 30, 1883.

M. L. WARD.

REPORT OF THE PROFESSOR OF AGRICULTURE, 1882–83.

To the Board of Regents:

GENTLEMEN — The following brief sketch of the work of the Farm Department for the year ending June 30th, 1883, with accompanying documents, is respectfully submitted:

The work of this department embraces, first, a course of instruction given to classes in the lecture room and upon the farm; second, the experimental work proper of the farm; and, third, general management of the farm, having reference to economical production, and the illustration of the principles of agriculture.

During the year covered by this report I have taught classes as shown by the subjoined tabular statement:

	Class.	*No.*
FALL TERM, 1882.		
Agriculture — young men	Fourth year	7
Physiology	Third year	20
Farming, (industrial) — young men	Third year	22
Rhetoricals	Third year	24
WINTER TERM, 1883.		
Agriculture — young men	Second year	39
United States history	First year	50
Rhetoricals	Third year	21
SPRING TERM, 1883.		
Anatomy, three weeks	Second year	22
Dairying, seven weeks — young ladies	Second year	7
Farming, (industrial) — young men	Second year	12
Rhetoricals	Third year	19

It is unnecessary, perhaps, for me to enter into details here of the work done by the several classes. The plan laid down in the catalogue for each branch of study has been followed with such variations as circumstances seemed to make desirable.

In the course in agriculture, I have aimed to give to the students, as fully as time allowed, those practical principles of farm management which have been established by the experience of the best farmers. But little effort has been made to explain these principles from scientific grounds. In many cases this is impossible, but, where possible, this work can be better done in other departments. Agriculture is a thing of itself, however much it may be aided by the investigations of science. I have always considered as coming within the scope of my department those subjects which consider profitable methods from the standpoint of experience.

On account of our inability to obtain a proper supply of milk at the beginning of the spring term, the class in dairying received considerably less than a term's work in the dairy. We have reason to hope that this difficulty will not be encountered in the future. However, even with the small supply of milk at our command, and the very inconvenient place in which the class was obliged to work, some excellent work was done by the class and some valuable experience gathered. I am under great obligations to Mrs. Kedzie for valuable assistance in this work.

The class in U. S. history, consisting of fifty students of the first year, was an overflow class from that taught by Prof. Platt.

The third-year class has had its rhetorical practice under my direction as in previous years. The class has had regular fortnightly meetings and much drill both in essay-writing and declamations. Every member of the class has, during the year, given two public declamations in the chapel, and to members of this class have been assigned by the Faculty the duties and honors of the undergraduates' exhibition of commencement.

Student Labor.—In the fall and spring terms the young men of the second and third-year classes have had regular "industrial" work upon the farm. This is the first instance in the history of this College in which actual farm work has been made a necessary condition to further advancement in the general course. The class has worked in two divisions, by half-terms alternately, upon the farm and in the Horticultural Department. In addition to those with whom the farm industrial has been a regular duty, a considerable number have voluntarily taken farming as an industrial; and these with the regular classes have done nearly or quite all the work that the farm has been able, profitably, to supply them. In the assignment of work the aim has been to give to every student an equal portion of all the various labors of the farm. The class during this year have husked and cribbed about 1,000 bushels of corn; they have put up a half-mile of board-and-wire fence; hauled and spread some two hundred two-horse loads of manure; besides having almost the entire care of the herds, plowing, harrowing and sowing, and doing much other less conspicuous work. As a rule, these students have worked most faithfully, as well, in most cases, as the average hired man, although bright and shining examples of an entirely opposite disposition have not been wanting. The labor system thus begun, I am satisfied, is a step in the right direction, and I can only regret that on account of the size of the farm, and the arrangement of the terms of the College year, I am unable now to recommend an extension of the work.

In addition to my regular duties upon the farm and in the class-room, I have during the year had the general editorial oversight of our College paper, the *Industrialist,* have attended and given one or more lectures at each of the Farmers' Institutes held at Mankato, Hiawatha, Edgerton and Columbus, and have done the share of committee work assigned me by the Faculty.

THE FARM.

The College farm, including the old College farm, occupies 271 acres, of which, roughly speaking, there is used by the horticultural department and occupied by the grounds and buildings about 52 acres. Of the remaining 219 acres, about 140 are in use as arable lands and tame-grass meadows, leaving 79 acres of unbroken prairie, all containing, however, more or less of tame grasses. The lower, or College farm proper, has been well fenced into fields, in size varying from six to eighteen acres. These fields have all been platted and regularly numbered. Beginning at the main entrance to the College grounds, the fields located south of the drive receive the consecutive odd numbers, and those north of the drive the consecutive even numbers. Those fields outside of this system receive the letters A, B, and C, without any particular order.

The rotation practiced upon the farm, with many variations, is a five-course system, as follows: 1st corn, 2d oats and millet in equal parts, 3d wheat, 4th clover and orchard-grass, 5th ditto. In this rotation the manure as a rule is applied to the corn ground, but sometimes to the land destined for millet. This rotation I know to be a useful one, and one that Kansas farmers generally might use with profit. The rotation, however, as before intimated, does not enslave us: it is used as long as it seems a convenience, and abandoned whenever it answers no useful purpose. I am satisfied of this, that the treatment given our farm during the past seven years has greatly improved its condition as to fertility, so much indeed that in all the elements of fertility it is better off to-day than when the original prairie sod was first broken.

The agricultural season covered by this report has been an exceptionally favorable one, especially for the wheat crop; although all crops have done well. Below is given, in tabular form, the results of the year's work with the principal farm crops. This statement, however, takes no account of crops grown experimentally and otherwise upon small detached pieces of ground, with which, for obvious reasons, no accurate account could be kept.

	Number of acres......	YIELD PER ACRE.		COST.	
		Bushels.	*Tons.*	*Bushels.*	*Tons.*
Corn	19	50	....	16 cents.	....
Wheat, winter	11	30.6	....	32 "	....
Oats	17	36.5	....	20 "	....
Millet	16	....	2.6	....	$2 30
Millet seed	1	16	....	50 "	....
Hay, mixed	6½	....	1.52	....	2 40

Fences and Buildings.—In addition to the usual repairs made from time to time, about seventy rods of new board-and-wire fence have been made on portions of two sides of field No. 2. This fence is a substantial one of three boards from the ground up, with barbed wire above them, with posts set every eight feet. This, in my judgment, is an economical fence for Western farmers. The wind has little effect upon it, and our experience shows that it "turns" the small pig, as well as the unruly bull. The wire fence, about sixty rods in length, flanking the College grounds on the south, was also constructed by this department, at the expense of the Executive Department. A considerable portion of the grading, terracing and sodding in front of the College building was the work of this department, also at the expense of the Executive Department.

The old implement shed, located south of the barn, was almost completely demolished by a gale of wind early in June. Plans for the reërection of this building in much more permanent form have already been submitted to the Board.

I desire, especially, to remind the Board that a considerable increase of the buildings of the farm is a necessity already felt with some severity. If the department is to make further growth, especially in the line of experimental work, a considerable increase in the buildings of the farm must be made at an early day. Already we are seriously embarrassed for lack of suitable room in which to carry out feeding experiments planned for the coming winter. We need a good barn, the same to be devoted exclusively to experimental work. An addition to the stock barn is also greatly needed. I hope soon to be able to submit for your consideration plans of buildings suited to our wants.

Stock.—The farm now owns the same number of work animals held by it a year ago, namely: Three horses and two mules. Of cattle, the farm now owns representatives of four breeds and one crossbred, in numbers as follows: Shorthorns, 21 head, 3 bulls and 18 cows and heifers; Aberdeen-Angus, 1 bull and 2 heifers; Galloway, 1 cow and 1 heifer; Jerseys, 1 bull and 6 cows and heifers, and 1 Angus-Galloway bull calf; a total of 36 head of cattle.

Of pigs, two breeds are now in use—Berkshire and Essex. Of the former, one boar and four brood sows are kept with a very variable number of younger ones. Of the Essex, one boar and two brood sows with recent litters of pigs complete the list. During the year, sickness has been almost entirely unknown in the herd. I have to report for the year a single casualty. The valuable Shorthorn bull, Pastmaster 46,722, was injured in the neck by a thrust from another bull. The bruise thus formed developed into an abscess which made it necessary to slaughter him.

EXPERIMENTS.— For the experimental work of this year, you are referred to the supplementary documents which accompany this report. I hereby request permission to publish, in pamphlet form, the details in full of the experimental work of the year; and that an edition of at least 4,000 be printed. The experimental work of the year covers the following subjects:

1. Experiments with sixty-five varieties of winter and spring wheats. The details of the experiment have already been published in full in the *Industrialist.*
2. Pig-feeding experiments showing the effects of *cold* weather in retarding the fattening process.
3. Pig-feeding experiments showing the value of milk to young pigs.
4. Experiences with the tame grasses.
5. Experiments showing the effects of manuring, subsoiling and thick-seeding on corn culture.
6. The culture of mangel wurzels in Kansas.
7. Carp culture.

I expect to be able to add to these in the pamphlet referred to, a chapter on the period of gestation of cows and sows, giving a record of the College herd for the past ten years. In conclusion, I respectfully request permission to purchase ten steers with which to test, the coming winter, the relative values of corn meal and corn-and-cob meal.

FINANCIAL STATEMENT.

	Dr.	*Cr.*
To valuation, June 30, 1882	$8,345 60	
Vouchers approved	2,207 42	
By valuation, June 30, 1883		$9,718 70
Amount received for stock produce and labor		1,501 50
Amount expended for fences, permanent improvements not inventoried		101 25
Amount expended for experiments not inventoried		85 40
Balance	853 83	
Totals	$11,406 85	$11,406 85

Respectfully submitted. E. M. SHELTON,

Professor of Agriculture and Superintendent of Farm.

REPORT OF THE PROFESSOR OF AGRICULTURE, 1883–84.

To the Board of Regents:

Gentlemen — The following outline of operations in the Farm Department for the year ending June 30th, 1884, is respectfully submitted.

My work in the class-room has, for the past year, been more nearly limited to the general line of my department than in any previous year of my connection with the College.

In the fall term I taught the regular fourth-year class in agriculture, 12 students; the third-year class in rhetoricals, 19 students; and a class in farming, consisting of 10 students of the third year. In the winter term my duties in the class-room were limited to the second-year class in agriculture, 52 students; and the third-year class in rhetoricals, 20 students. During the spring term I had a class of 20, for the most part students of the fourth year, in U. S. constitution; a class of 41 in farming; and the regular third-year class in rhetoricals.

In the fourth-year class in agriculture, instruction was given in part by lectures, although for the most part a text-book was used. Such subjects as the Principles of Breeding, Rotation of Crops, Manures, and Farm Buildings, were considered. The second-year class in agriculture was taught wholly by lectures. The subjects considered were History and Literature of Agriculture, External Forms of Domesticated Animals, History of Breeds, Farm Implements and Machines, Special Crops, including grasses. The third-year class in rhetoricals, which I have had in charge some five years, has had regular work in the preparation and delivery of essays, declamations, and orations, and each member of the class has three times in the course of the year given declamations or orations in the chapel before the students and Faculty. The class in farming has had regular work on the farm, each student working two and one-half hours twice weekly. The class, however, has been divided into two divisions, which worked by half-terms alternately upon the farm and in the nursery. I am glad to be able to speak strongly of the industry and efficiency of our students working upon the farm. A very large amount of work has been done by the class, principally at hauling manure — some 400 two-horse loads — in the various tillage operations, fencing, ditching and grading, the care and management of the herd, and relaying stone walls. I only regret that the size of the farm and the extent of our farm operations will not now warrant me in recommending a considerable extension of this system of farm industrials.

The class in U. S. constitution was assigned me temporarily by the Faculty, with the object of furnishing Pres. Fairchild, the regular teacher of the class, needed relief from an unusual pressure of work.

Of the seven Farmers' Institutes participated in by the College Faculty during the year, I have taken part in five, held at the following places:

Burlingame, Osborne, Effingham, Sterling, and Garden City. Of the great value of these Farmers' Institutes to the localities in which they are held, we have abundant evidence. To my own department and myself I have reason to know that these farmers' meetings are specially helpful. Through them I have been brought in close contact with that large class whom the College farm is especially designed to benefit. In this way I learn the needs of farmers, listen to their criticisms, and am enabled to present to them the results of the work of the department.

During the year, as in previous years, I have had the general editorial oversight of the College paper, the *Industrialist.* The paper has been issued regularly, with two brief interruptions, during the College year. Accompanying this report is a complete list of the newspapers which now exchange with the *Industrialist.* The total number of these exchanges is 191, of which three are dailies and the remainder weeklies, monthlies and quarterlies. All exchanges, after passing through the hands of the editors, are placed in the general reading room, to which all have access.

THE FARM.

In the general management of the farm no material changes have been made since last year. In general, the farm has been more thoroughly cultivated, more manure has been hauled to the field, and the crops kept cleaner than in any previous year. As a result, the yield of all crops and the capacity of the farm for live stock has steadily increased.

In September, Edwin Gregory, who, for some months, had acted as foreman of the farm, resigned his position, which has since been acceptably filled by Warren Whitney.

In general the agricultural season covered by this report has been a favorable one to most of the staple crops. The corn crop was somewhat shortened by the very dry weather, which, in this section of the State, prevailed late in July; but the wheat crop was very good, and as much may be said of oats, the hay crop, and roots so far as grown. We have grown during the year 285 bushels of wheat from 9½ acres; 960 bushels of corn from 24 acres; 22½ tons of millet hay from 9 acres, and 444 bushels of oats from 11 acres of ground. Besides these field crops, various other crops have been grown in small areas, including, among others, 200 bushels of mangel wurzels, a small area of flax, and several sorts of experimental grains.

STOCK.

The live stock of the farm has steadily increased in numbers and value since I reported last. The herd now, as in several past years, embraces four distinct breeds of cattle, namely, Shorthorns, Jerseys, Aberdeen-Angus, and Galloways. The first-mentioned breed greatly exceeds in numbers all of the others. I have to report a few important recent changes in the herd of neat cattle. In August last I visited the herd of Wm. Warfield, of Lexington, Ky., and there selected a yearling Shorthorn bull of the well-known

"Gwynne" family. This young animal is now in use upon the College farm, where a promising career apparently lies before him. In September the Aberdeen-Angus bull "Falerino," was sold at a price somewhat beyond his original cost, and in the November following the superior imported bull "Certainty" was secured for use in the Aberdeen-Angus portion of the herd. On account of the vicious disposition manifested by our Jersey bull "Bismarck," it was deemed best to dispose of him, which was accordingly done. His place has since been filled by a very superior yearling recently purchased by Dr. O. F. Searl, of Solomon City, Kansas.

Important additions have been made by purchase also to our stock of swine. In August last I purchased of the well-known breeders of Poland-China pigs, Messrs. H. M. and W. P. Sisson, of Galesburg, Illinois, a trio of pigs of that breed, consisting of a boar and two sows. We are indebted to these gentlemen for very liberal treatment both in the animals which they furnished, and in the prices charged. Later in the year I purchased of Mr. N. Green, of Manhattan, a pair of superior gilts of the Jersey Red or Duroc breed. At the present time the College owns four breeds of swine, namely, Berkshires, Essex, Poland-China, and Jersey Reds.

FENCES AND BUILDINGS.

The fences and buildings of the farm have been maintained in a good state of repair, and besides, valuable additions have been made to both. The old implement shed, demolished by a hurricane in June of last year, has been replaced by a good story-and-a-half building of pine battened, 56x22 feet, occupying the position of the old building south of the barn. The new implement house has stalls for three wagons; the remainder of the lower story is provided with a plank floor upon which are kept the heavier tools and machines. The upper half-story so far has furnished ample room for small tools and light machines. The building is firmly anchored to the substantial stone-wall foundation which underlies it completely. The total cost of this building was $614.48. The experiment in feeding steers made necessary the erection of a shed in which to feed the animals experimented with. It is a plain, unpainted pine structure, costing $105.37. The entire carpenter work of these two buildings was very satisfactorily done by Supt. Hawkes, of the Mechanical Department, and his assistants, mostly students of the College. In this connection I desire to refer to a need of the department which is now pressingly felt as the experimental work of the farm enlarges; namely, a barn especially designed for experimental uses. The present farm barn is constantly overcrowded with the stock and products of general farming, so that whatever experiments are made, we are compelled to make special and temporary arrangements for, as in the case of the experiment with steers above referred to. A stone barn about 45x70 feet with basement, would, with proper equipments, be ample for our wants for some years to come. Such a building could, at the present time, be erected for about $4,500. We also need at once a new corn crib with a capacity for about 2,000 bushels of corn, and a shed with hay loft, and on the ground floor boxes and stalls for bulls and young cattle. The corn crib properly finished would cost about $500, and the shed $600.

Important improvements in the fences of the farm have been made during the year. The stone wall between the entrance gate to the College grounds and the southeast corner of the farm has been torn down and relaid in a thoroughly substantial manner, at a cost to the department of $133.60. An excellent stone wall is now in process of construction on two sides of the east twenty acres of the old College farm, known as the Marlatt field. This work is being done under the direction, and at the expense, of the Executive Department. The work of relaying the principal walls of the old College farm, now in a bad state of repair, has been commenced and will be hastened to completion.

Among other improvements of a permanent character should be mentioned the drilling of a well seventy-eight feet deep in connection with the piggery, at a cost of $133.22, and the digging of fish-pond No. 3, having an area of about 50x100 feet. The cost of the latter work was something under $50.

The progress of the various new enterprises lately inaugurated upon the farm makes necessary the completion of various incidental improvements at an early day. The steam engine and boiler ordered by the Board will compel the construction of an engine-house north of the barn, and the completion of a large cistern as a source of water-supply to the engine.

Of field B, (16 acres,) now a prairie pasture, ten acres are being fenced for a wheat crop. This ten acres should be fenced as soon as the work can be done. Fields 4 and 6 also need a good pig-proof dividing fence.

EXPERIMENTS.

In this report I cannot do more than to barely indicate my work under this head, much of it being incomplete, and therefore content myself with naming the following subjects which have been during the year, or are now, under examination experimentally:

1. Feeding steers with the object of ascertaining the value of cob meal.
2. Different methods of cultivating corn.
3. Some hitherto untried grasses and clovers.
4. The value of alfalfa as food for hogs.
5. The shrinkage of corn in the crib.
6. Pig feeding to ascertain the value of cob meal.

I expect to report to you in detail the result of these investigations as soon as the work upon each subject has been completed.

Since my last general report of the experimental work of the farm for 1883 has been published in the form of a pamphlet of 48 pages. This pamphlet was printed by the Printing Department of the College, and in a manner very creditable to Supt. Thompson and his assistants. Five thousand copies of the work have been issued and distributed among farmers and others likely to be interested in them.

FINANCIAL STATEMENT.

To valuation, June, 30, 1883	$9,718 70	
Vouchers approved	5,846 07	
By valuation, June 30, 1884		$11,788 18
Amount received for stock, produce and labor		3,541 49
Amount expended for fences, permanent improvements not inventoried		133 60
Amount expended in experiments not inventoried		457 00
Balance	255 50	
Total	$15,920 27	$15,920 27

Respectfully submitted. E. M. SHELTON.
MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF CHEMISTRY, 1882–83.

To the Board of Regents:

GENTLEMEN — The following report of my work during the year ending June 30th, 1883, and of the condition of the Chemical Department at its close, is respectfully submitted.

The class work was that of the course of study. During the fall term the class in inorganic chemistry numbered sixty, fifty-three of whom were present at the term examination. Barker's College Chemistry was used as a text-book. The lessons from the text-book were supplemented, as usual, by much additional matter. This very large class recited in one division, contrary to the usual custom. It was too large for the most successful work. Experimental demonstration at the lecture table and laboratory practice have, as formerly, constituted an important feature of the course in chemistry. I also taught a fourth-year class, numbering twelve, in physics and meteorology.

My classes for the winter term were organic chemistry, mineralogy, and agricultural chemistry. The first class numbered forty-nine. At the end of six weeks, the class took up mineralogy. The course in this work has been to devote one hour each day to class recitations, and one hour to the study and determination of minerals from blow-pipe and other chemical and physical properties. Crystallography is not made a very prominent part of the course, but rather an acquaintance with the minerals themselves and a knowledge of their uses is aimed at. Our work room has forty places at which students can work. The class in mineralogy during the last year numbered forty-four. It was with considerable inconvenience that the four students were provided places.

There were eight persons in the class in geology, twenty-one in the class in chemical physics, thirty-one in chemical analysis, the latter working two hours each day.

In addition to these regular classes, there have been throughout the year from two to four special students in chemistry. The time given these has been fully equal to that given a regular class.

You are aware that the quantitative laboratory has been temporarily occupied by the printing office. The growing wants of my department will soon necessitate the return of that large room to our use. I hope that this matter may be kept in mind in allotting rooms in the new building.

Besides the strictly college work, there has been considerable analytical work in the department. These analyses, however, have been made mainly in response to requests from people of our State. My time has been so fully occupied with my classes that systematic investigations have been entirely out of the question. With the help in my department which you have so generously provided, I hope to show better work with my classes, and to be able to carry on certain experimental work.

I have now growing plants of four varieties of sorghum, viz., Early Amber, Link's Hybrid, Kansas Orange, and Honduras. It is the intention to make such investigations upon their value as sugar plants as time and opportunity will permit.

During the year a very valuable collection of fossil leaves from the Dakota formation in our State was added to our museum by purchase from Mr. S. C. Mason, one of our students. These are fine individual specimens, and the collection is quite complete, containing the greater number of species already named and a number that are new. A suite of ores representing all the principal mines of Colorado, New Mexico and Arizona have been added to the mineralogical collections. These ores cannot be easily duplicated. The scrupulous care of the collector in noting all accessible facts regarding the ores and the mines from which they were obtained, renders this collection doubly valuable. Other minor additions to the cabinets were made during the year. A number of fine pieces of physical apparatus were purchased during the year. The three hundred dollars allowed for this purpose were expended to the best advantage, the effort being to procure good instruments rather than a greater number of cheap ones. I wish to call your attention to the advantages in importing supplies duty free, as we are permitted to do for the use of the College. Thirty to forty per cent. may be saved by this means. We should now be able to purchase in sufficient quantity to justify importing. We will thus obtain superior articles at low rates.

Respectfully submitted. G. H. FAILYER.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE PROFESSOR OF CHEMISTRY, 1883–84.

To the Board of Regents:

GENTLEMEN—The classes in my department during the year closing June 30, 1884, and the number of students in the classes, were as follows:

Fall Term—Physics and meteorology, 16; inorganic chemistry, 83; special students, 2.

Winter Term—Agricultural chemistry, 24; organic chemistry (six weeks), 77; mineralogy (six weeks), 64; special students, 4.

Spring Term—Chemical physics, 16; chemical analysis, 48; special students, 3.

In addition to the usual analytical work done by the department, a systematic examination of four varieties of sorghum was undertaken in the fall of 1883. These varieties were Early Amber, Link's Hybrid, Honduras, and Orange. These investigations were made with the view of comparing these varieties, of learning the composition of the juice at the various stages of development of the plant, and to observe other circumstances that may influence the quality of the juice of the sorghum. For the details of this work you are respectfully referred to the last quarterly report of the State Board of Agriculture, for the year 1883. The results were there published in full. During the year the equipment of the department has been greatly increased, additional tables with gas, water and apparatus have been put in, and we have now accommodations for forty-eight students in chemical practice and qualitative work. The principal additions of apparatus, however, have been in the line of appliances for advanced work. We now have a supply of glass ware, for the purpose, such as beakers, flasks, pipettes, burettes and litre bottles, sufficient to meet our needs for the present.

Small additions to the mineralogical cabinet have also been made.

The room just vacated by the Printing Department will be needed for class use toward the close of the coming year. To fit it for this purpose it must be supplied with work-tables, water, and gas. It will be desirable to use the south room of the laboratory for quantitative work exclusively. The assay furnace has been kept in this room heretofore for lack of room. It is obvious that the dirt and dust necessarily connected with assaying render neat and accurate analytical work next to impossible when both are performed in the same room. It seems essential that a room be constructed in the basement of the building for assay purposes.

I ask that you make provision for these much-needed improvements. The heating of the laboratory building by steam is another matter which I think well deserves your attention. This source of heat is to be desired not only as a means of warming the rooms, but by reason of the use that may be made of this constant and uniform heat in our chemical work.

Respectfully submitted.

G. H. FAILYER.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF HORTICULTURE, BOTANY AND ZOÖLOGY, 1882-83.

To the Board of Regents:

Gentlemen—The following report covers the work of my department during the year ending June 30, 1883.

CLASS WORK.

Botany.—The study of botany is given two terms in the course of four years. The spring term of the second year is occupied in the study of the primary principles of morphology and vegetable physiology, and the elements of botanical classification. The students of this class are generally very deficient in knowledge of the methods of study in natural science, and need the time that is given them in training their powers of correct observation. The class for the last year of one hundred and three pupils, necessitated the division of the class into two sections. A requirement promptly met by the class was the preparation, by each student, of the collection of forty species of the local flora.

The fourth-year class studied botany in the winter term, taking up the full consideration of plant physiology and study with the microscope of the anatomy of the different groups. The structure, habits and classification of the lower groups was made a special study. In the work of this term, each student made daily use of one of the compound microscopes belonging to this department, and kept drawings and notes of his observations, which were held open to inspection by the instructor and interested visitors. The study and elaboration of some special topics, selected by himself, was required, and the results embodied in a paper presented at the close of the term's work. As examples of this, papers were presented on the following substances:

Starch: its occurrence in different plants and in different parts; the peculiarities in form of the grains.

Breathing pores in plants; form, development, and location.

Location of the wood bundles in the different groups.

The gross and minute atoms of the geranium and all of its parts.

Crystals in plants, and kindred topics.

The text-books in use are Gray's "Lessons and Manual" and Bessey's "Botany for Schools and Colleges."

Horticulture.—In the fall term, a class in horticulture, comprising twenty-one young men and twelve young women, second-year students, was in my charge. The study, as heretofore, was considered as an application of the facts of botany to practice, and the endeavor has been to show the dependence of horticultural methods upon such facts. Besides the study of principles and methods as treated in the text-book, "Barry's Fruit Garden," special topics were treated in supplementary lectures, which include, for example, such topics as the Kansas fruit list, wind-breaks, use and management of hot-beds, propagation and treatment of ornamental trees and shrubs, with their use in planting, tree plantations for timber, with other topics demanding more attention than given in the text-book. The students of this class are all alike required to become familiar, by practice, with the modes of propagation suited to the season of the study.

During the year thirty-four different young men were assigned to my charge for industrial work in horticulture. These did work in all the branches of nursery and orchard treatment suited to the season of their employment, and received pay on a basis of ten cents per hour for any work of benefit to the department and not strictly instructive.

ZOÖLOGY.—A class of twelve fourth-year students devoted the winter term to this study, using as a text-book Packard's "Zoölogy." The study was made practical by the dissection, examination and drawing of different typical specimens, notes and drawings being preserved by each member. The increased facilities of the department in instruments and illustrative material were put to full use.

ENTOMOLOGY.—The class in entomology, comprising thirty second-year students, devoted seven weeks of the spring term to this study. The instruction was given in a course of lectures embodying an outline of the structure, habits and classification of the principal groups of injurious and beneficial insects, accompanied by the study of specimens. Tables for the classification of their prominent families were prepared by myself with considerable care, and printed in pamphlet form for the use of the students. This pamphlet was also used by Prof. Snow in the classes at the State University. The aim of the course in entomology is to enable the student to make intelligent use of the literature and methods in economic entomology, and it is desirable that the time be lengthened to an entire term, instead of seven weeks, as at present.

OTHER CLASSES.—In addition to the above regular classes, I have had charge of three advanced students, two terms each, in the study of special topics in botany and zoölogy. One studied the lower vegetable forms, another the reptiles, and a third the birds, of the locality, the two latter doing substantial work in the museum.

I have also had charge of the second-year students, fifty-five in number, in rhetorical work during the entire year. These met on alternate Fridays for drill in declamation and composition, their oversight demanding a considerable attention outside of the class hours.

The following summary shows the enrollment in different classes during the school year:

SUMMARY OF ENROLLMENT.

	Young men......	Young women......	Total......
Horticulture	21	12	33
Horticulture, industrial, fall term	14	....	14
Horticulture, industrial, spring term	20	....	20
Zoölogy	5	7	12
Botany, advanced	8	6	14
Entomology	20	10	30
Botany, elementary	67	36	103
Special students (two terms each)	3	....	3
Rhetoricals (the year)	35	20	55
Total enrollment	193	91	284
An increase over last year of	....	....	42

WORK ON THE GROUNDS.

Last spring the ground upon which some of the small-fruit plantations were growing was exchanged with the farm for portions of the land east of the College building, necessitating the resetting of these plantations. In the new location are to be found the rows of raspberries, blackberries, etc., to the west of which the ground is devoted to the experimental comparison of different modes of culture of some of our best varieties of strawberries. Fourteen new varieties of strawberries, including some of the much-advertised sorts, are added, making the total number of varieties thirty-four.

Several thousand root-grafts of the apple, made by the students in horticulture, were planted, a large percentage of which are now healthy young trees. These are principally of standard and readily salable sorts. Grafts of a number of new and promising apples were inserted for fruiting on tops in the north orchard. These were principally obtained through the kindness of F. K. Phœnix, of the Delavan nurseries.

Sixteen plum trees of four varieties, twenty peach trees of ten varieties, and thirty grapevines of twelve varieties, have been added to the plantations of those fruits, having been propagated chiefly on our grounds by students.

The ground to the east of the College and between the branches of the drive was graded, manured, pulverized and seeded to orchard grass, as a permanent lawn. This will need no further seeding.

To the lawn along the drives and west of the College building were removed several hundred trees and shrubs, most of them from the rows on the grounds, a lot of red cedars being purchased. Many of these trees and shrubs are of varieties quite rare in the West, and our plantings will furnish the first test of their value here. The experiment of two years since was repeated in the removal of about twenty-five large Austrian pines of fifteen years' growth from the upper farm. The work was done while the earth was frozen about their roots, and the expense was about $2 per tree. The trial seems successful, at present every tree being in good growth.

In the arboretum many of the less common shrubs and trees were propagated in such numbers as were needed, while a few new ones were introduced. The number of varieties of shrubs and trees now growing healthily on the grounds and promising well is encouraging. The results of tests in this direction have been and will be published from time to time; and as with the increasing wealth of our State comes the demand for a more varied landscape planting to break the monotony of cottonwoods, soft maples and cabbage roses, we expect to be ready to furnish information of value to the planters.

The bedding on the lawns was confined to the use of well-known plants, excepting that a bed of succulents was planted as giving variety. The results in the use of some of the varieties tried are unexpected, and will give us a basis for better work in future plantings of this kind.

In the greenhouse, its crowded state has not permitted any display or increase. The limited space has been made the most of, and the stock has steadily increased in value.

MUSEUM.

During the year the museum room has been furnished, and the new cases filled with the collections. A new case for display in economic entomology is nearly completed, and a second herbarium case has been built. The most noteworthy additions to the museum collections are: A number of handsomely mounted birds, donated from their duplicates by the State Board of Agriculture through Secretary Sims; a lot of mounted birds received in exchange with Dr. Blachly, of Manhattan; a collection of forty-two skins of western birds, donated by Mr. Frank Williston, of this place; a collection of bird skins made by M. T. Ward, a student, as special industrial work; a fine collection of fresh-water bivalve mollusks from the waters of the vicinity, made by S. C. Mason, a student, under the direction of the department; a collection of fishes, made by Mr. Mason, Supt. Graham, and myself; and a number of choice marine specimens from Guaymas, Mexico, received in exchange from Prof. F. W. Cragin, of Topeka.

Besides the work indicated in the foregoing portions of this report, I have had my proportion of the work in institutes, in Chapel lectures, and in the *Industrialist;* have acted as entomologist to the State Board of Agriculture, and as Secretary of the Kansas Academy of Science — some of these duties requiring a considerable amount of correspondence.

FINANCIAL STATEMENT.

The following statement will indicate approximately the direction of the expenditures of the department:

Total expenditures, as per vouchers	$1,730 31
In department bills	175 00
Total	$1,905 31

This total is chargeable as follows:

Grounds	$317 06
Nursery and forest-tree plants	235 74
Fruits	402 22
Buildings, team, and tools	246 29
Greenhouse	63 90
Class-room and appliances	318 36
Museum	271 04
Office and furniture	24 80
Freight and express	25 90
Total	$1,905 31

I have the Treasurer's receipts for cash paid him on department accounts for	$672 80
Department bills in my favor	1 20
Increase in inventory	679 35
Total credits to department	$1,353 35

Respectfully submitted.

EDWIN A. POPENOE.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE PROFESSOR OF HORTICULTURE AND ENTOMOLOGY, 1883–84.

To the Board of Regents:

GENTLEMEN: I have the honor to present the following report upon the work of the Department of Horticulture and Entomology for the year ending June 30, 1884:

CLASS WORK.

SCHEDULE OF CLASSES.

Studies.	*Males.*	*Females.*	*Total.*
FALL TERM.			
Horticulture	44	25	69
Rhetoricals of second-year class (all year)	25	18	43
Industrial horticulture, third year	14	......	14
WINTER TERM.			
Industrial horticulture (optional)	7	4	11
Geography (first-year students)	39	11	50
SPRING TERM.			
Entomology	42	19	61
Horticulture, industrial, second year	37	......	37
Horticulture, industrial, greenhouse work	....	3	3
Total in all classes	208	80	288

The course in the studies in my department, save as noticed below, has not been materially changed since my last report, and the methods of teaching have been substantially the same as therein set forth. The completion of the greenhouse has enabled us to accommodate a limited class of young ladies in the general greenhouse work suited to their strength. This opportunity was taken in the winter term by four, in the spring term by three, young ladies. Each of these performed all the routine of greenhouse work of the season, including the propagation of plants, transplanting, potting, pruning, destroying insects, etc.

A change in the arrangement of time in the study of physiology allowed me to devote to the study of entomology with the second-year students, ten weeks—the entire spring term, instead of seven weeks, as heretofore; a change profitable to both teacher and students, as evidenced in the more than proportional proficiency of the class in this important study.

ILLUSTRATIVE AND EXPERIMENTAL PLANTING.

The lists of fruit trees and shrubs in the different classes have received considerable accessions through purchase, exchange, and donation, adding greatly to the value of the collections as means of illustration and comparative study of varieties.

A general enumeration of the sorts of each class is given in Appendix B of this report, and shows accessions to the general list by purchase, of—

Apples	5	varieties	Pears, dwarf	20	varieties
Pears, standard	38	“	Peaches	5	“
Apricots	8	“	Raspberries	10	“
Blackberries	9	“	Currants	7	“
Gooseberries	4	“	Plums and quinces	1	each
Cherries	3	“			

By donation, cions of apples, about 150 varieties, for top-grafting; raspberries, 2 sorts; quince, 1 sort.

By exchange, apple trees, 5 varieties; pears, 3 varieties.

The list of ornamental trees and shrubs for test planting was also largely increased, the most important additions being of ornamental trees, 55 varieties; shrubs, 35 varieties; hardy perennials, 70 varieties.

THE GREENHOUSE.

The greenhouse has been a point of attraction to both students and visitors at the College. The stock of plants contains a representation of many prominent families of exotic plants, a few deficiencies in the list still existing, but these will be filled in due time.

The purposes served by the greenhouse as the source of material for use in the summer ornamentation of the lawns, and for the propagation of ornamental and useful plants, handled with difficulty by ordinary methods, is of great and growing importance, enabling us to produce results not otherwise attainable except at a considerable annual expense. Besides its usefulness in this direction, it is the source of a small but increasing revenue to the department, through the sales of surplus stock, in amount not yet demanding a separate account, but growing with the demand by the local public.

The plants are also of much use to the students of botany, to whom they are always available for study, and by whom the privilege seems to be fully appreciated. I believe the expense of the maintenance of this structure and its contents will be fully returned in the way of illustration, and more so with each year succeeding.

GENERAL WORK ON THE GROUNDS AND IN THE GARDENS.

During the winter and early spring a considerable portion of the north orchard, and parts of the lawn in front of the chemical laboratory and horticultural hall, were top-dressed with well-rotted manure, to the great improvement of each. The peach orchard was also manured, and a few loads of leached ashes spread about the trees. The plot of ground to be planted to pears was thoroughly manured and not cropped, but frequently plowed, until it is in excellent shape. The ground about the greenhouse was graded and terraced, the surfaces being then covered with blue-grass sod taken from the field east of the College building. The work was performed during regular working hours by the industrial students, and was quite successful, as evidenced at this date by the fresh appearance of the lawn in these portions. Its growth was assisted during the dry weeks of spring by watering from the cisterns by the greenhouse hose.

An additional lot of Austrian and Scotch pines were moved during the freezing weather from the upper farm; and a large number of Table Mountain pines and large red cedars, purchased at a neighboring nursery, were moved in the same manner to suitable places on the main lawn. But one tree of the lot has failed to make a fair growth during the summer.

A number of apple seedlings, about 3,000, were grown for class use in grafting, by sowing pomace from the cider mill, in early winter. This mode of planting is not productive of an even stand, but is much less laborious than the cleaning of the seeds.

A large number of seedlings of the white and green ashes, hardy catalpa, wild blackberry and white maple, were grown for planting upon the upper farm. Many other trees and shrubs were grown from cuttings or seeds for use in the planting of the lawns.

The usual number of apple grafts were made by the class, and were planted by them in the nursery grounds.

The principal portion of the two and three-year-old stock was disposed of at fair prices to parties from the counties west, where they were retailed to planters.

In November, 12 plants of each of about 30 sorts of strawberries were potted and removed to the cool greenhouse, where, after a short rest, they were started into growth with a view to testing their relative value for forcing, and to experiment on the effects of cross-fertilization. The great inequality of growth and the differences in the time of blooming of the different sorts prevented the attainment of any satisfactory results on the latter point. A few seedlings were grown from the berries produced by some of these plants, and will be fruited the coming season.

In growth, the six most vigorous were Sharpless, Crescent, Forest Pride, Manchester, Bidwell, and Wilson.

In flowering, the earliest six were Longfellow, Marvin, Miner's, Black Defiance, Forest Pride, and Warren.

In fruiting, the six fruiting most abundantly were Forest Pride, Marvin, Longfellow, Miner's, Crystal City, and Downing.

The poor success of this experiment was due largely, I believe, to the lack of previous attention to the preparation of the plants for forcing. They should have been lifted earlier in the season, and in larger numbers, to provide against the great irregularity in their period of blooming. The experiment is now in process of trial in different circumstances.

The following outline of the finances of the department will show the direction of the expenditures:

Total cash outlay	$5,378 82
Appropriation	2,500 00
Excess of outlay over appropriation	2,878 82
Excess of outlay over receipts	1,829 92
Of which the pay roll is	1,538 15
Cash receipts of department	1,048 90

The outlay is chargeable approximately as indicated in the following account:

Greenhouse building and fixtures	$2,827 28
Greenhouse stock (pots and plants)	190 10
Freight and express (on lumber, plants, etc.)	161 31
Team and tools	439 70
Nursery and experimental planting	295 30
Expended on grounds	643 71
Garden experiments	49 72
Orchard	374 55
Vineyard and small fruits	162 60
Museum	175 00
Office expenses	13 15
General instruction	46 40

Respectfully submitted. E. A. POPENOE.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF ELEMENTARY MATHEMATICS AND ENGLISH, 1882–83.

To the Board of Regents:

GENTLEMEN — Permit me to present the following report of the work done in my department during the last year.

I have taught, during the year, classes in United States history, book-keeping, commercial law, arithmetic, English, geography, elocution, and singing.

As I have repeatedly set before the Board in former reports my views in regard to these branches of study, and the manner of presenting them to classes, it is scarcely necessary for me to add anything in that line, on the present occasion. Suffice it to say, that I have endeavored so to mingle the practical with the theoretical as to produce the best results. In book-keeping, I have taken more pains during the last year to ascertain the methods adopted by business men than in any former year. I have visited all the prominent business houses in Manhattan and many of those in other towns, and, by the courtesy of the proprietors, have examined their books and learned the plans they adopt in recording business transactions; and while no two of these plans are exactly alike, and all are more or less diverse from the systems taught in the schools, yet, if a pupil learns the fundamental principles of book-keeping, and has practice in recording all kinds of business transactions, he can shortly apply this knowledge in any direction which seems desirable.

Instruction in commercial law was, for the first time, placed in my hands last year. This I gave to the class in book-keeping by lectures during the last month of the winter term.

The number in the classes by terms is as follows:

FALL TERM.

Arithmetic A, taught in two divisions: Enrolled during term, 91; examined at close of term, 77. Arithmetic B, in one class: Enrolled during term, 66; examined at close of term, 58. English B, in one class: Enrolled during term, 63; examined at close of term, 46. Several members advanced to a higher class during the term.

WINTER TERM.

Book-keeping, in two divisions: Enrolled during term, 110; examined at close of term, 89. This class is memorable for being the largest ever enrolled in this branch. One division of the class in United States history: Enrolled during term, 58; examined at close of term, 45. English B, in one division: Enrolled during term, 46; examined at close of term, 34.

SPRING TERM.

Book-keeping: Enrolled during term, 27; examined at close of term, 23. Arithmetic: Enrolled during term, 24; examined at close of term, 19. Geography: Enrolled during term, 7; examined at close of term, 6.

Some of these classes, especially during the winter term, were larger than is conducive to the best results. No man can take a class of sixty or over and do as good work for each particular pupil as he can with a class of thirty to forty.

I had charge of a class of from forty to sixty during the entire year in rhetorical exercises.

My singing class, in two grades, was held on alternate days, except Friday, at from 1:30 to 2:30 P. M. This class numbered from about sixty to eighty, the largest classes being in the winter term. I charged each pupil an average price of one dollar each term, and my receipts from this source during the year were about two hundred dollars.

In closing this my last report in connection with the Kansas Agricultural College, I would simply say that I have the satisfaction of feeling that during my nineteen years' connection with this College I have endeavored to perform the duties assigned me faithfully and energetically. With what measure of success this has been done, I must leave others to judge.

I shall always cherish kindly feelings toward this institution, and hope that its future may be even more grand and useful than its past has been.

J. E. PLATT.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE PROFESSOR OF MILITARY SCIENCE, 1882-83.

To the Board of Regents:

GENTLEMEN — I have the honor to submit my report as Professor of Military Science and Tactics for the year ending June 30, 1883.

The work done in the Military Department may be divided into two parts — drill and class instructions.

In drill, the students who have been enrolled have been instructed in the schools of the soldier and company, including the manual of arms; in skirmish drill, and, to a limited extent, in bayonet exercise and battalion drill. There has also been some instruction in target practice, the targets and general system of practice being the same as those used in the regular service.

In all of these exercises the progress has been very satisfactory. Attendance at drill is optional, but once chosen must be continued for at least one term. The time spent in drill rarely exceeds three hours per week.

The arms and accoutrements used are, with the exception of the waist-belts, all of the latest regulation pattern; the rifles being those known as the Cadet, caliber .45. No uniform has, as yet, been adopted for those taking drill. A neat and serviceable uniform dress would add very much to the interest and efficiency of the exercise, and it is respectfully asked that the matter of authorizing a uniform be considered by the Board. A suit of dark-blue flannel with plain forage cap could probably be furnished at an expense of $15, possibly cheaper.

In class instruction the young men of the second year have been required to attend lectures twice a week during the last half of the fall and first half of the winter terms. The lectures in the fall term were designed to give a general idea of army organization and of military duties and responsibilities. In the winter term the twelve lectures were devoted to a consideration of the more important campaigns and battles of the Rebellion of 1861-65.

In addition to the duties of my own department, assistance has been given in the Department of English and History.

During the fall term I had a third-year class in general history, and a first-year class in English; in the winter term, a third-year class in rhetoric and a first-year in English; and in the spring term, a third-year class in English literature. Besides, I have had charge during the entire year of a first-year class in rhetorical exercises, and have done my share of editorial work on the *Industrialist.*

The numbers enrolled in the various classes for the different terms are embodied in the following summary:

FALL TERM.

Drill: Begun, 73; completed, 68. Military science: Begun, 32; completed, 32. General history: Begun, 36; completed, 32. English: Begun, 25; completed, 22. Rhetorical exercises: Begun, 62; completed, 57.

WINTER TERM.

Drill: Begun, 29; completed 24. Military science: Begun, 30; completed, 30. Rhetoric: Begun, 32; completed, 32. English: Begun, 41; completed, 30. Rhetorical exercises: Begun, 35; completed, 25.

SPRING TERM.

Drill: Begun, 22; completed, 20. English literature: Begun, 21; completed, 19. Rhetorical exercises: Begun, 37; completed, 33.

The following statement shows the financial condition of this department for the year ending June 30, 1883:

	Dr.	*Cr.*
To inventory, June 30, 1882	$84 60	
To cash expenditures	35 90	
To department bills	4 40	
By inventory, June 30, 1883		$107 65
By balance		17 25
Totals	$124 90	$124 90

I am, very respectfully, your obedient servant,

ALBERT TODD, First Lieut. First U. S. Artillery,
Professor of Military Science and Tactics.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE PROFESSOR OF MILITARY SCIENCE, 1883–84.

To the Board of Regents:

Gentlemen—I have the honor to submit the following report for the College year ending June 30, 1884.

During the year the instruction in this department has been similar to that in previous years. Drills have taken place three times a week except in the spring term, when, owing to conflict with other College duties, there were but two drills a week. The drills were held during one of the regular College hours (fifty minutes). They comprised the regular infantry drills, and, in addition, bayonet and sword exercise. A limited amount of time was devoted to target practice, this exercise taking place in the afternoon. A reasonable degree of proficiency has been attained by all the students attending drill, and a large proportion have become very well drilled. I report, as a matter of especial gratification to myself and as a compliment to the students, that during the three years that I have had charge of this department, there has not been a single case of insubordination or disobedience to orders, nor have I been obliged to report any student to the Faculty for discipline.

The theoretical instruction has been identical with that of last year, except that synopses of the fall course of lectures and the full text of the winter lectures have been printed, on the College press, for the use of the students.

In addition to the work in my own department, I have had charge of the classes in general history, rhetoricals, and English literature, and assisted, during the winter term, in United States history. The instruction in these branches has been similar to that in previous years, except that the young women of the fourth-year class took up in the fall term the critical study of some of the works of the best authors, English and American. This study is supplementary to that of the spring term of the third year, when more attention is given to the history of literature than to the literature itself. It is to be regretted that this additional instruction cannot be given to the young men as well as to the young women.

I have also assisted in the instruction of the second-year class in rhetorical exercises, have taken a share of the work on the *Industrialist*, and have served on two of the Faculty committees.

The numbers enrolled in the several classes during the year are given in the following table:

TERM.	DRILL.		MILITARY SCIENCE.		GENERAL HISTORY.		RHETORIC.		ENGLISH LITERATURE.		U. S. HISTORY.		RHETORICAL EXERCISES.	
	Began	*Com*	*Began*	*Com*	*Began*	*Com*	*Began*	*Com*	*Began*	*Com*	*Began*	*Com*	*Began*	*Com*
Fall	79	69	45	44	30	26	....	....	4	4	....	....	40	38
Winter	38	31	40	38	....	....	33	33	....	....	46	44	44	39
Spring	40	37	....	....	....	....	....	....	28	25	....	....	33	31
During year	106		45		....		....		31		....		51	

In the number during the year, only the number of different students is set down.

The present report is the last that I shall have the honor to submit to the Board of Regents, as I have been relieved from duty at this College on July 1st, 1884, and ordered to duty elsewhere. In taking leave of the Board I desire to express my hearty thanks for the interest taken by them in my department. My relations with the Board of Regents and with the Faculty have been uniformly pleasant and kindly, and I leave the College with keen regret and with the heartiest wishes for its future welfare.

I am, very respectfully, your obedient servant,

ALBERT TODD, *First Lieut. First U. S. Artillery.*

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF BOTANY AND ZOÖLOGY, 1883–84.

To the Board of Regents:

GENTLEMEN — During the year I have given instruction in the following branches, now included in the Natural History Department, viz., botany, zoölogy, geology, and physiology; and by way of assistance to other professors whose classes were excessively large, I have had charge of a class, for one term, in elementary arithmetic. Besides the class-work mentioned, I have met one class in rhetorical exercises fortnightly during the year, delivered one lecture before the students and Faculty, and one before a Farmers' Institute.

The number of students enrolled in the several classes was as follows:

Elementary botany	85
Structural botany	19
Special botany	3
Zoölogy	14
Physiology	20
Geology	15
Industrials	4
Rhetoricals	95
Arithmetic	101
Total	356

The class work consisted of recitations in the main, but accompanied by examination of specimens, by experiments and demonstrations, and occasionally supplemented by lectures. The aim has been to enable the student to become thoroughly conversant with the elementary principles of the sciences studied, with a view to their practical application, and also to furnish a basis for more extended study, observation and investigation.

My first work, aside from the class-room, was directed to the improvement of the herbarium. Many of the plants were infected with insect-pests, which necessitated the repoisoning of the entire lot of specimens. The labels were rewritten, and the mounting of the specimens completed. I had efficient but gratuitous help in all this tedious work, which otherwise would have been much more prolonged. On most of the museum specimens labels have been placed with the common names plainly written, which renders the collection both more interesting and instructive to the numerous visitors.

I have from time to time during the year collected such zoölogical material for the museum, not already to be found in the collections, as the immediate vicinity yielded. Students also, have, to some extent, aided in this work. In this way forty valuable specimens were added to the collections. I have collected many flowering plants and parasitic fungi, some of the latter new to science, and all new to the collections, but have not as yet found time to incorporate them into the herbarium. This work, however, will be done in the early part of the next year. I have donated from my own duplicates, collected mainly in Germany and Switzerland, six hundred and twenty-five specimens of flowering plants. The other most important addition to the museum during the year was a set of 488 geological specimens, and a set of fresh-water shells, purchased of S. C. Mason, a former student of this College, who collected them in various parts of Kansas.

I cannot refrain from urging the pressing need of much more extended space for the proper exhibition of the various natural history collections. When this is accomplished the museum will be much more attractive and instructive to the public, and still more valuable as the indispensable aid to students in the study of the several natural sciences.

It is very desirable that we have as complete representation as possible of the mineralogy and geology, as well as the flora and fauna, of our State. The collections may be increased somewhat by purchase; but preferably, more rapidly and economically by collecting tours in remote parts of the State. In fact, by the latter method alone can we increase our collections in economic geology, zoölogy and botany commensurately with the practical importance of these branches.

The following statement shows the expenses of the department during the year:

Department transfer bills	$2,939 00	
Museum specimens	102 00	
Department bills, labor	37 48	
		$3,078 48
Museum supplies	$112 73	
Freight and drayage	14 45	
		127 18
Class-room and appliances	$140 49	
Department bills	14 50	
Freight and drayage	10 05	
		165 04
Total		$3,370 70
Total inventory, June 30		$3,234 75

Respectfully submitted.

W. A. KELLERMAN,
Professor of Botany and Zoölogy.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF MECHANICS AND ENGINEERING, 1883–84.

To the Board of Regents:

GENTLEMEN — I present the following report of the work done in the Department of Mechanics and Engineering for the Collegiate year 1883–84:

TABULAR VIEW OF CLASSES.

Studies.	*Males.*	*Females.*	*Total.*
FALL TERM.			
Arithmetic	28	19	47
Trigonometry and surveying	14	5	19
Writing (two divisions)	69	17	86
WINTER TERM.			
Mechanics	14	4	18
Book-keeping (two divisions)	68	42	110
SPRING TERM.			
Book-keeping	15	7	22
Arithmetic	22	17	39
Civil engineering	11	....	11
Writing	27	13	40

Besides instruction in my own department, I have taught classes in arithmetic, book-keeping and writing, as may be seen by the tabular statement. The work done in arithmetic has been satisfactory. The pupils have paid particular attention to three things — accuracy, rapidity, and neatness. Improvement in the first and last of these essentials has been most marked; the second takes time and considerable practice to develop. I have long believed that the shortest and surest road to a knowledge of arithmetic is by actual practice in originating and solving problems, and not by memorizing rules or by demonstrating propositions. The process should come first, and then the reason for that process in the pupil's own language. The members of my arithmetic classes mastered the art first, and the science followed. Care has been exercised lest the mechanical drill should be practiced and understood without knowing why each step is taken.

During the the year I have had in my charge three classes in book-keeping. We have not treated of such subjects as commission, banking, shipping, etc., but all our time has been devoted to the principles underlying the study. Complete sets in both single and double entry have been mastered, as well as the most practical forms for farmers. Commercial law has been a prominent feature in the work of this class. The following subjects were presented: Contracts, sale of personal property, negotiable paper, interest, agency, partnership, bailment, carriers of freight, carriers of passengers, real estate, and forms of business paper.

In writing, there were two classes during the fall term, consisting of pupils of the "B" division, and one class during the spring term, organized for the benefit of the third and fourth-year classes. Considerable interest was manifested in the practice, and great improvement was the result. The aim has not been so much to make penmen, as to train the muscles and the mind to work together in producing rapid and graceful writing. Business writing can only be acquired by long and patient labor. To train the hand to move in obedience to the will is not the work of a day or of a term, but of years. Most of the pupils who have taken the drill in these classes have continued to practice during most of the year, and as a result, they have changed their awkward handwriting to a fair business hand. Improvement in uniformity of slant, in smoothness of lines, and in the general form of letters, has been especially noticeable. This acquirement of a legible handwriting by those preparing for our first year's work will insure neater manuscripts for the remainder of the course, and will furnish the pupils themselves with a valuable auxiliary in any vocation that they may follow after leaving this institution.

The fact that those in their third year have their farm work during the fall term has prevented them from getting as much practical work in surveying as I desired. Sufficient practice, however, was taken to understand how to run lines, to lay out land, to meander roads and creeks, and to do leveling and some section work. Data of the College farm were gathered, and a creditable map was drawn by each member of the class. This practical work was preceded by very interesting class drill in trigonometry, both plane and spherical.

In mechanics, we discussed the subjects of force, machines, motion, and liquids and gases. Analytical geometry and conic sections should precede this study.

The spring term was devoted to civil engineering. In the absence of a regular class in draughting, we gave considerable attention to that part of the subject. A pupil who is unable to represent what he sees, or even conceives, may get the theoretical part of civil engineering, but his knowledge will serve no useful purpose in a professional sense. I would call the attention of the Board to the desirability of extending the drawing now required with this study, so as to include engineering draughting. Then the designs mapped out by class drill may be not only described in words, but may be indelibly impressed upon the mind by drawing them in section or outline.

In attending institutes, writing for the *Industrialist*, lecturing, teaching the fourth-year class in rhetoricals, I have done my part as one of the Faculty.

Respectfully submitted. B. F. NIHART,
Professor of Mechanics and Engineering.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE PROFESSOR OF MATHEMATICS, 1883–84.

To the Board of Regents:

SIRS — I herein submit a report of the work done in my department during the past year.

The following is an exhibit of the number of students in the various classes under my charge in the different terms:

Studies.	*No. enrolled...*	*No. examined...*
FALL TERM.		
Algebra (two divisions)	75	60
Arithmetic (two divisions)	70	60
English grammar	48	44
Rhetoricals (on alternate Fridays)	40	....
WINTER TERM.		
Geometry (two divisions)	64	59
Arithmetic	45	37
English grammar (two divisions)	80	47
Rhetoricals (on alternate Fridays)	41	....
SPRING TERM.		
Geometry (two divisions)	53	47
Algebra (two divisions)	86	74
Geography	18	11
Rhetoricals	26	....

In instructing the various classes in my charge, I try to pursue methods which are in accordance with advanced thought on educational topics, and which have stood the test of experience in the schoolroom. The aim has been to present that which is practical, and at the same time to secure such discipline as will thoroughly prepare students for the more advanced work in our course. In algebra and geometry I have experienced some difficulty in the limited time devoted to these branches, in accomplishing all that the course of study contemplates and yet doing good work. The classes, in this respect, even surpassed my expectations; and, while I am satisfied that better work can be done next year, I regret that the course in mathematics is not more extensive. I hope that in the near future more time can be allowed for thorough training in algebra and geometry, so that students may be still better prepared for the third-year studies in mathematics.

Expenses of my department for the past year have been $4.35 for printing.

Respectfully submitted.

D. E. LANTZ,
Professor of Mathematics.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE INSTRUCTOR IN INDUSTRIAL DRAWING, 1882–83.

To the Board of Regents:

GENTLEMEN—Allow me to submit the following report of the Department of Industrial Drawing for the collegiate year 1882–83.

The number of students enrolled in my department has been 256 in the fall term, 85 in the winter term, and 193 in the spring term. Five classes have been taught daily. The methods of instruction and text-books followed by the classes of the first year, *i. e.*, the students of geometrical construction, and freehand drawing "in the flat," were those of Prof. Walter Smith, Art Director of Massachusetts. The classes of the second and third year were taught by lectures, those of the second year receiving a course on projection and perspective, and those of the third year a course on shades and shadows, higher perspective, and the development of regular curves as the result of intersections of plain and warped surfaces. Each student of these two classes was required to draw and color a set of plates 17x22 inches, representing on a group of geometrical solids the subjects taught. These plates, executed in India ink and water color, were on exhibition in my class-room during commencement, and were undoubtedly noticed by the Board. I may add that, since my connection with the College, no class has done as much good work as has been done by the third-year class during this term.

According to our rules, students that show special aptitude in this direction are permitted to take drawing during the whole collegiate course. Quite a number of students availed themselves of this opportunity during the past year, male students studying architectural and machine drawing, and female students object drawing or designing, and in a few cases sepia, water color and oil painting.

During the year, the department, through the kindness of the Board, has added to its tools and collections several sets of drawing studies, 18 small drawing boards, a proportional divider, a bow pen, a three-legged compass and a straight-edge beam-compass. These articles have been of great value in the work of the year; but, with the classes, and especially with the increasing number of advanced students who wish to take drawing as an extra study during the third and fourth years of the course, a great many additional tools, models, casts and lithographs will be almost absolutely necessary during the coming year.

The new, large and well-lighted class-room in the second story of the center part of the new building, with its steam radiators, professor's studio, tool cabinet, and lavatory, which was assigned to my department at the beginning of the school year, has been a great help in my work. I shall endeavor to ornament it in a suitable manner during the coming vacation, for which work I ask the kind coöperation of the Board.

Respectfully submitted.

J. D. WALTERS,
Instructor in Drawing.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE INSTRUCTOR IN INDUSTRIAL DRAWING, 1883–84.

To the Board of Regents:

GENTLEMEN — I have the honor to submit for your consideration the following report of the Department of Industrial Drawing for the collegiate year 1883–84:

TABULAR VIEW OF CLASSES IN DRAWING.

TERMS.	FREEHAND DRAWING.		MECHANICAL DRAWING.				TOTAL.
	Primary.	*Advanced.*	*1st year.*	*2d year.*	*3d year.*	*Advanced.*	
Fall	3	20	113	....	....	27	163
Winter	74	17	3	....	....	17	111
Spring	46	45	....	56	10	13	170
Total	123	82	116	56	10	57	444

In addition to these regular classes in drawing I taught arithmetic to a class of twenty-two first-year ("B") students in the winter term, and to a class of fifteen students of the same grade in the spring term. As these classes in arithmetic worked parallel with the classes of the same grade in the regular department of mathematics, I will not here enlarge upon this work.

I also supervised the work in map-drawing done by the class in surveying. Each member of this class drew, colored and inked a large map (36x56 inches) of the College farm after their own surveys. The greater part of this work was done afternoons and Saturdays.

It would gratify me to give you the details of the work done by the several classes named in the preceding table, but it would occupy too much of your valuable time. For the methods of teaching pursued in my regular work I refer you to my former reports. The only change of importance made has been the adoption of a text-book, "Morse's Mechanical Drawing," Books III and IV, for the second-year class. It is in my plan of instruction to use the whole work, consisting of six books, the coming year, *i. e.*, two books in each of the three terms given to this study. Prof. Morse's work corresponds closely with the course of lectures which I have delivered to the second and third-year classes during the past seven years, and is the text-book many instructors in mechanical drawing have been looking for.

The advancement made by the students has been very satisfactory. In our catalogue we say that pupils who show special aptitude in this direction and can maintain a reasonable standing in their classes may take drawing during any part of the course. The preceding table, in the columns "Advanced Freehand Drawing," and "Advanced Mechanical Drawing," shows that altogether 139 terms of such "work of love" were taught during the year. No student remains for many weeks in a class of volunteers unless he likes the work to a good degree and feels that the advancement made by him will pay for the time expended. It must be expected, therefore, that the work done by these pupils is of the best possible kind, and it seems wise to give them as much of the teacher's time as possible. In my opinion, it is necessary to relieve the instructor from all outside work, such as teaching classes in arithmetic, and should the attendance at the institution increase for another year at the rate of the year past, the department will require more than one teacher.

The department took an active part in an exhibition of school work connected with the winter session of the State Teachers' Association. Though the time was not the best for a fine display of work, our exhibit drew many favorable comments from the educators present, and may have been the means of introducing the "new study" into many schools of the State. There were on exhibition in a separate alcove in the Capitol building, where the session was held, 89 complete books in geometrical drawing by the first-year classes, 13 advanced freehand drawings from objects, 4 pen drawings, 4 sepia landscapes, and 20 large architectural studies in water colors and India ink.

Of the annual exhibition of the department in the class-room during commencement I need not speak at great length, as the work was undoubtedly seen by you. The collection was much larger than any previous one. It consisted of about 500 plates by the second-year class in orthographical projection and shades and shadows, of about 60 architectural studies, 16 large studies of the human form, partly from flats and partly from casts, 22 pencil drawings from objects, 14 studies of mechanical movements and contrivances, and more than 30 studies from flats, such as ornaments, flowers, and simple designs.

During the year, the department, through the kindness of the Board, has added to its tools and collections a patent drawing table, an apparatus for blue printing, several sets of advanced drawing studies, and a very valuable collection of plaster casts with neat pedestals, illustrating the best work of the Greek, the Roman, the Renaissance, and the present period of sculpture. The collection consists of a full-size (7½ feet) statue of the Venus of Milo, a two-third-size statue of Atlas with the globe, large busts of Demosthenes, Cicero, Antinous, and Apollo Belvidere, a large copy of Michael Angelo's Moses, a full-size statue of Psyche by Teede, and a full-size statue of Hebe by Thorwaldsen. The undersigned, in person and partly at his own expense.

selected this collection for the College at the shops of Equi & Co., in Chicago.

The department is now reasonably well equipped with everything that is necessary to carry on its regular class work. Less provision has been made for advanced and post-graduate work. Many things are needed in this direction. Some attention should be given in the future to the collection and purchase of models and articles of industrial and fine art, to form the nucleus of an art museum — the most indispensable auxiliary to all successful higher-art teaching. A museum is to a student of art as necessary as a library to the student of literature.

Respectfully submitted. J. D. WALTERS.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE INSTRUCTOR IN ENGLISH AND HISTORY.

To the Board of Regents:

GENTLEMEN — The following report of my work for the College year of 1882–83 is respectfully submitted.

FALL TERM.

During the fall term four classes were under my instruction — three classes in English grammar, and one in arithmetic. Each of these classes contained about forty students.

The work in grammar was a final review, preparatory to taking up advanced studies in language. The text-book used was Reed & Kellogg's Higher Lessons in English. There is necessarily some friction in beginning work with so large a class, accustomed, as they are, to many different text-books and methods. After a few preliminary lessons, which serve to indicate the general proficiency of the class, and to give them the necessary acquaintance with some new definitions, the analysis of complex and compound sentences is begun, and is made the basis of the term's work. In connection with analysis, opportunity is found for a review of technical grammar, for the study of rules, for the use of capitals and punctuation marks, for some exercise in diagram of sentences, and for drill in letter writing and other forms of composition with special reference to neatness in the arrangement and in the mechanical execution. With but few exceptions, the classes worked well, and manifested a very commendable earnestness and interest in a study which is to many uninteresting and confusing.

In arithmetic, also, the work was the finishing of that subject, as a study in the course; the text-book used being Brooks's Union Arithmetic, from percentage. The class worked faithfully and made good progress. Some students, however, had not had sufficient preparation to enable them to acquire such a mastery of arithmetical processes as ought to be attained before the subject is dropped.

WINTER TERM.

This term, also, I spent four hours daily in the class-room—three hours being occupied with classes in word analysis, and one with another class in arithmetic.

For the first-named classes, the text-book was Swinton's Word Analysis. After about two weeks of lectures on the origin of the English language, the meanings of the principal Latin, Greek and Anglo-Saxon prefixes and suffixes were learned; also the more obvious phonetic laws involved in the derivation of words. Then a considerable number of the most fruitful Latin and Greek roots were studied carefully. The more important derivatives from each root, with their primary and derived meanings, were furnished by the book; in addition to these, students were encouraged to bring in as many others as they could form from any given radical by means of the prefixes and suffixes which had been already learned. The roots to be studied were selected largely with reference to the frequency with which they would be encountered in the scientific studies of the course. Along with this work abundant opportunities are found for drill in the use of synonyms in definition, in spelling, and in the pronunciation of scientific terms.

The work of the arithmetic class was the same as that performed by the class of the preceding term.

My classes this term also average about forty in numbers.

SPRING TERM.

My classes this term were three in number—a class in grammar and two classes in Hill's Elements of Composition and Rhetoric.

The plan for the class in grammar was the same as that already sketched. Although the time was shorter by several weeks, this class did fully as good work as the class of the fall term, because of their better preparation.

The text-book in composition and rhetoric is intended as a compendium of rules for composition, rather than a formal presentation of the science of rhetoric, which is placed later in the course. The text was quite thoroughly mastered, but this rendered it difficult to find time for as much drill in composition as is desirable. Besides other class-room drill, considerable time was spent in the preparation of plans for compositions and in the improvement and rearrangement of faulty plans furnished in the book. The regular class rhetoricals of this term were made to supplement the work as far as possible.

Besides the class-room work thus briefly set forth, I have had charge, during the entire year, of a first-year class in rhetorical exercises. With the exception of one essay a term from each member of the class, the work has been in the line of reading and declamation, with drill in elocution.

The further disposal of my time will appear in the report of the Librarian. Respectfully,

W. H. COWLES,
Instructor in English and History.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE INSTRUCTOR IN ENGLISH AND HISTORY, 1883–84.

To the Board of Regents:

GENTLEMEN—The following report of my work for the College year of 1883–84 is respectfully submitted.

FALL TERM.

During the fall term I was occupied with class-work for four out of the five hours into which our daily session is divided. One hour was devoted to the "B" class in grammar. More students come to us deficient in this than in any other study, partly because they have chosen not to take it in the common schools, and partly because the instruction in grammar is not so good as in the other studies. With such students the work in grammar can be nothing but elementary. The other hours were occupied with divisions of the regular first-year class in grammar. The text-book used was the same as last year. The general plan of work was also substantially the same. The analysis of sentences forms the basis of the term's work; in connection with it, opportunity is found for drill in diagraming, in technical grammar, in the use of capitals and marks of punctuation, and in composition, particularly letter-writing, with special reference to neatness in arrangement and mechanical execution. The object of the term's work is to secure that readiness and correctness in the use of language, the possession of which is no very conspicuous accomplishment, but the absence of which at once marks a man as uneducated; it also furnishes the indispensable foundation for success in the prosecution of advanced studies in language and literature. The classes averaged about forty members each; and, with but few exceptions, the work performed was both faithful and successful.

WINTER TERM.

During the winter term I taught one division of the class in United States history; also the class in English structure, in three divisions, thus having four hours of class-work daily, as in the preceding term.

The text-book in history was Higginson's. The work is altogether superior to the common run of text-books in history, in its choice of matter and its literary style. It is, however, incomplete, and requires much collateral reading to give an adequate presentation of the subject. The class, I am confident, leaves the study with a better idea of historical style, and a truer appreciation of what history really is, than usually results from a single term's work.

The work in English structure, or word analysis, was the same in kind as that done last year. There was considerable improvement in the quality and increase in the quantity of work performed. Two weeks were occupied with lectures on the origin and growth of the English language. The meanings of the principal Anglo-Saxon, Latin, and Greek affixes were then learned, together with the phonetic laws involved in the derivation of words. Then a careful study was made of some hundreds of the most fruitful Latin and Greek roots. The principal derivatives and their meanings were furnished by the book; students were encouraged to form by means of the affixes already learned, as many additional derivatives as possible. The roots to be thus studied we selected largely with reference to the frequency of their occurrence in the scientific studies of the course. This work gives abundant opportunity for practice in spelling, in definition, in the pronunciation of scientific terms, and in the use of synonyms.

SPRING TERM.

This term, also, I had four classes; two in grammar, and two in composition and the elements of rhetoric. One of the classes in grammar was still "B." This one only numbered ten. The other was also "B," but was now ready for the work that ought to have been done in the fall. The classes in composition pursued the same plan as last year, with a considerable increase in scope and thoroughness.

Besides the class-work thus routined, I had a first-year class in rhetorical exercises throughout the year. The work was chiefly in the line of reading and declamation, emphasis and inflection.

My other duties appear in the report of the Librarian.

Respectfully submitted. W. H. COWLES.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE LIBRARIAN, 1882–83.

To the Board of Regents:

GENTLEMEN — As acting Librarian I have the honor to submit the following report for the year ending June 30, 1883.

During the fall term the Faculty prepared a list of books to cover most of the legislative appropriation of $1,000. These books were ordered through Mr. Townsend MacCoun, of Chicago. The remainder of the appropriation was expended in the course of the year in meeting wants of the various departments as they arose, and in securing books that are rare and out of print, as opportunity offered.

There were added to the library during the year:

By purchase	356	volumes.
By binding magazines	19	"
By donations	24	"
Total	399	"

In addition to these, there have been some twenty-five volumes added by donation which are duplicates of volumes already in our possession; also a large number of periodicals and pamphlets unbound, many of which are of considerable value.

The total number of volumes in the library, exclusive of duplicates and unbound periodicals and pamphlets, was, at the end of the year, 3,979.

The library has been open for reading and drawing books from 8 o'clock until 1 o'clock of each school-day, and on Saturday from 9 until 12.

During the fall and winter terms I regularly spent one hour of the forenoon in the library, and in the spring term two hours. I also spent the greater part of the forenoon of Saturday at work in the library. There have been several students at work in the library under my direction during the year; most of them working only one hour per day. The work performed has included making a daily record of the books drawn and returned; pasting in each book a slip containing the printed regulations in regard to the use of the library, the alcove, case and shelf, showing where the book belongs, and a number corresponding to the number of the book as recorded in the inventory; and the beginning of a card catalogue of authors and another of subjects. Neither of these is yet available for use, but the catalogue of authors can, I think, be completed this year. There is a very noticeable increase in the use that is made of the library; yet, to the great mass of the students, the value of the library will be about doubled by the completion of the catalogue.

The reading room has been open during both forenoon and afternoon, and has been a great center of attraction to the students. Last year $100 were expended in subscriptions to standard literary and technical periodicals. The exchanges of the *Industrialist* are here made accessible to the students. These include nearly all the papers from this State as well as a considerable number from other States.

Respectfully submitted. W. H. COWLES, *Acting Librarian.*

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE LIBRARIAN, 1883–84.

To the Board of Regents:

GENTLEMEN — I have the honor to submit the following report as acting Librarian of the College for the year ending June 30, 1884.

As heretofore, each member of the Faculty prepared a list of books relating to his own department. These lists were submitted to the Faculty as a body, and the resulting list was turned over to the Librarian with directions to purchase. Books to cover the greater part of the appropriation of $500, were obtained early in the year through Mr. S. M. Fox, of this place. The remainder of the appropriation was taken up in the course of the year in securing books just issued, and various special lots, which cannot be obtained through the regular channels.

The general management of the library has been substantially the same as last year. The room was open for consultation and for drawing books during five hours of each day, and longer still when, as was generally the case, members of the upper classes working in the library could have a general oversight. During one hour of the forenoon, and a few minutes at the close of the session, I have been in the library myself. During each of the other four hours a student of the third or fourth year has been present in the library to render assistance in finding books; when not thus engaged the time was occupied by work on the catalogue or making a record of the books drawn. I have usually spent the greater part of Saturday forenoon, also, at work in the library. As in former years, students have had the freest access to the shelves whenever the library was open. Once during the holiday vacation, and again at the end of the spring term, the books were completely overhauled for the purpose of discovering losses, restoring books misplaced, and culling out those needing repairs. The result of this somewhat tedious undertaking is the strongest possible testimony to the care and fidelity of our large body of students in their use of their library privileges.

The provision of the last Legislature by which our binding has been done at the State Publishing House has been of very material service to us in enabling us to have bound a considerable accumulation of periodicals which could hitherto be bound only by diminishing by so much the amount available for new books.

Some effort has been made to dispose of a part of the duplicates that have accumulated in the library. By exchange with individuals and with other institutions, we have got rid of about forty volumes. Ten other volumes have been sold.

A considerable number of donations have been made, and are thankfully acknowledged. Some of these are duplicates of what we already have. A list of the principal donations, with the names of the donors, is appended to this report.

The additions to the number of bound volumes in the library during the year have been as follows:

By purchase	293	volumes
By binding periodicals	165	"
By donations	102	"
By exchange of duplicates	62	"
Total	622	volumes

The total reported last year was somewhat too small, owing to deficiencies in the record of accessions, the amount of which had not been determined at the time of making the report. With the addition of last year's accessions, the library now numbers 5,074 volumes, exclusive of unbound periodicals and pamphlets, of which there are perhaps 1,300. This total also excludes between three and four hundred duplicates. The totals, according to the following classification, are approximately as follows:

Science	520
Horticulture and botany	150
Agriculture	450
Literature	700
Religion and social science	850
Periodical literature	150
Biography and travels	580
History	500
Military	200
Public documents	450
Mathematics	300
Arts	100
Books of reference	150

The $150 expended by the Board and exchanges of the *Industrialist* have sufficed to supply the reading room quite fully, and have made it a favorite resort for those who have hours unoccupied. Ten dollars' worth of binders for the more valuable periodicals, and a more commodious reading table, constitute the principal additions to the equipment of the reading room. The Library Committee would recommend a renewal of the appropriation of $150 for periodicals. I append to this report a list of the periodicals subscribed for last year, and a summary of the other publications received at the reading room.

It will be noticed that, under the present arrangement, any time that I spend on library work is just so much added to the full work in teaching. It seems as though the growth of the library must very soon bring the time when it will be desirable to secure some one whose work it shall be to make the library more useful to the students.

APPENDIX A.

Donations for the year ending June 30, 1884, were as follows:

By Governor Glick:

Goss's Catalogue of the Birds of Kansas.

By F. A. Nitchy:

16 volumes of the American Agriculturist.
3 volumes of Agriculture of Georgia, 1880, 1881, 1882.

By State Secretaries:

Session Laws of Kansas, 1883.
Senate Journal, Kansas, 1882.
House Journal, Kansas, 1882.
Report State Supt. Public Instruction, Kansas, 1882.

By J. A. Anderson, M. C.:

3 vols. 12th Report of Geological and Geographical Survey of the Territories.
Mineral Resources of the United States, 1883.
Report of Department of Interior.
U. S. Coast Survey, 1882.
Memorial of Joseph Henry.
4 vols. Report of the Tenth Census.
Report on Forestry, 1882.
Report on the Sorghum Industry, 1882.
Memorial of Garfield.
Report on Finance, 1883.
Bi-Monthly Gazette U. S. Patent Office.

By J. J. Ingalls, U. S. Senator:

15 vols. Smithsonian Miscellaneous Collections.
9 vols Smithsonian Contributions to Knowledge.

By E. F. Ware:

7 vols. Monthly Reports Department Agriculture.
3 vols. Herndon's Valley of the Amazon.
3 vols. Patent Office Report.
Agriculture of Iowa, 1872.
Diseases of Cattle.
19 vols. Department of Agriculture Reports.

By the Secretaries, through Prof. Popenoe:

9 vols. Transactions Minnesota Horticultural Society.
6 vols. Transactions Indiana Horticultural Society.
Insects of New York.

By Pres. Fairchild:

7 vols. Literary World.
Michigan Horticulture, 1883.

By Dr. Benj. Woodman:

Cooper on the Breast.

In addition to these the library has received a large number of catalogues, pamphlets, and other donations, which are duly appreciated.

APPENDIX B.

LIST OF THE PERIODICALS SUBSCRIBED FOR IN 1884.

Name.	*Price.*
WEEKLIES.	
The Nation	$2 85
Harper's Weekly	3 30
Harper's Bazaar	3 30
Scientific American and supplement	6 00
Nature	5 50
Cultivator and Country Gentleman	2 00
Rural New Yorker	1 75
Chemical News	5 00
London Garden	8 00
Journal of the Telegraph	1 25
Science	4 65
Electrical Review	2 45
Gardener's Chronicle	5 95
Architect	5 40
SEMI-WEEKLY.	
Literary World	1 90
MONTHLIES.	
Delineator	1 05
Popular Science Monthly	4 15
American Journal of Science and Art	5 00
Magazine of American History	4 25
Century	3 60
Harper's Monthly	3 10
Atlantic Monthly	3 30
Eclectic Engineering Magazine	4 50
American Naturalist	3 35
Botanical Gazette	95
Gardener's Monthly	1 50
Manufacturer and Builder	1 25
American Agriculturist	1 05
North American Review	4 20
American Counting Room	2 00
Household	85
Housekeeper	50
Herald of Health	85
New York Fashion Bazaar	2 35
Art Journal	8 00
Music World	2 00
Eclectic	4 25
Longman's Magazine	2 25
BI-MONTHLY.	
Education	3 50
QUARTERLIES.	
Journal of Military Service Institution	2 00
The Auk	2 90
Journal of Royal Chemical Society	7 40
London Journal of Microscopy	7 40
SEMI-ANNUAL.	
Journal Royal Agricultural Society	3 75

The reading room also receives some hundreds of other publications, either as donations or as exchanges with the *Industrialist*. These include dailies from Topeka, Leavenworth, and Kansas City; most of the weeklies published in Kansas; and a considerable number of agricultural and trade journals, religious papers, and other periodicals from this and other States.

Respectfully submitted. W. H. COWLES.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE SUPERINTENDENT OF TELEGRAPHY, 1882–83.

To the Board of Regents:

GENTLEMEN—My duties as an officer of the College during the year ending June 30, 1883, were as follows:

As Superintendent of the Telegraph Department, I have to report that I have enrolled during the year 82 students—26 ladies and 56 gentlemen. This enrollment is an increase of 4 as compared with that of last year.

The methods of training used in this department were much the same as those used in former years. Each student was required to practice one hour daily in the College office, under the direction of the Superintendent, and this practice was supplemented with occasional lectures on topics directly in line with the training here given: such as the battery—its plant and maintenance; the line—how to construct and repair telegraph lines; the circuit—metallic, shunt, and ordinary telegraphic; instruments—their construction, use and care; insulators—their kinds and uses; and other electrical subjects not directly related to telegraphy, but serving to give the students an outline knowledge of the many uses to which electricity is put.

The more advanced students were allowed offices on the College telegraph line, which placed each student's room in communication with all the members of his class and with the Superintendent. One hour in the evening of each school day was devoted to the regular telegraphic business of sending and receiving messages, train orders, etc. At the end of each week, each student made a report to the Superintendent of all such business transacted by him during the week, using exact copies of the blanks in use by the Western Union Telegraph Company, and the prominent railroad telegraphs in this State. This practical book-keeping has been a good training for the students, and has been of much use to them in their other duties at the College.

A number of the latest and best works on electricity and kindred subjects have been drawn from the library for use in this department, and placed where the students can have free access to them as books of reference, much to their advantage.

The financial condition of the department is shown in the following statement of expenditures and receipts:

EXPENDITURES.	
Line	$25 19
Instruments	14 86
Battery	48 06
Tools	7 28
Bells	7 40
Type writer	6 90
Students' labor	124 15
Incidentals	1 35
Freight and drayage	17 40
Refunded fees	3 00
Department bills	21 45
Total	$277 04

RECEIPTS.	
Cash received as fees	291 00
Increase in inventory	48 35
Department bills	20 75
Total	$360 10
Balance	83 06
Actual cash balance	35 41

My other duties are briefly stated, as follows: A class in geography during the winter term. This class belonged to the "B" division of the first-year class, the crowded condition of which made it necessary that some assistance be rendered the professors in teaching, and this class was assigned to myself.

As Secretary of the Faculty, I have had charge of the Faculty records and the students' grade register, in which the grades of each student are entered after each examination, and a statement of the standing of each student is then mailed to his parents.

As book-keeper, a large amount of work was done under the direction of the Secretary of the Board in his office, which shows for itself.

The chapel roll, upon which absences are noted each morning and reported to the President at the end of each week, has been in my charge, as has also the electric-bell system, which controls the movements of the classes in all the College buildings.

I read a paper before each of two Farmers' Institutes — at Manhattan, and Mankato, Jewell county — of the series participated in by the College last winter.

I have taken my regular monthly turn at the editorial work of the *Industrialist* throughout the year, and have also done such work as came to me through the standing committees of the Faculty, of which I was a member.

In the spring term I delivered a lecture before the College, as is required of each member of the Faculty in turn.

The type-writer, purchased for the Telegraph Department, has been of value in printing the chapel roll for the bulletin board; in copying the reports of the members of the Faculty for the State Printer; in writing letters; and in preparing a list of authors and their works for the library.

The Telegraph Department is in better condition, in all respects, than ever before.

Respectfully submitted.

I. D. GRAHAM, *Superintendent.*

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE SUPERINTENDENT OF TELEGRAPHY, 1883–84.

To the Board of Regents:

GENTLEMEN — The Telegraph Department has enrolled during the year just closed, 67 students — 18 ladies and 49 gentlemen — being a decrease of 15 as compared with the enrollment of last year.

The methods of instruction remain much the same as in previous years. The facilities of the department have been increased by the addition of a number of the latest and best books published on the practical applications of electricity as illustrated in the telegraph, the telephone, the electric light, etc.

The receipts and expenditures are shown in the following table:

EXPENDITURES.		
Line	$82 13	
Instruments	63 99	
Battery	48 10	
Tools	8 30	
Type-writer	5 75	
Students' pay roll	171 40	
Freight and drayage	13 46	
Refunded fees	5 00	
Telephone	74 70	
		$472 83
Department bills	$34 55	
Inventory, July 1, 1883	691 85	
		726 40
Total debits		$1,199 23
CREDITS.		
Cash received for fees		$235 87
Department bills	$12 65	
Inventory, July 1, 1884	894 67	
		907 32
Total credits		$1,143 19
Balance, expense		$56 04

The type-writer belonging to the Telegraph Department has been of great value in preparing the catalogue of authors for the library, and other work; but, owing to the fact that it is in use about five hours a day by students who are only beginning to learn its use, it is very difficult to keep it in proper condition for the neat and accurate work required in the library and elsewhere. The work done on this machine by the Telegraph Department, the Secretary's office and the library, is too much for the good of the machine or for satisfactory work in either department. I would therefore suggest that the machine now belonging to the Telegraph Department be transferred to the Secretary's office, and, if thought desirable to respond to the very considerable demand for instruction in type-writing in this department, that a new machine be purchased for this purpose. A cheaper machine would answer equally well the requirements of beginners, and, with a few slight repairs, the one now in use would do satisfactory work in the Secretary's office.

My other duties as an officer of the College are as follows:

As book-keeper of the Board my work is already familiar through your inspection of the books of the Secretary's office at each meeting of the Board.

Since April 1st, at which time I was elected Assistant Secretary, I have had more direct responsibility in the keeping of the financial records of the College. This will show for itself in the books and reports.

As Secretary of the Faculty my work has been much the same as heretofore, except the increase in quantity which comes with each increase in number of students in attendance at the College. Perhaps in no single department is the growth of the College felt so soon, so directly, or in such a degree, as in the constantly increasing work of the Secretary's office.

My added duties as Assistant Secretary of the Board, together with the other work that has fallen to my share: viz., the editorial work of the *Industrialist*, at which I have taken my regular turn throughout the year; the Farmers' Institutes participated in by the College each winter, of which I attended and read papers before those held at Effingham, Atchison county, Olathe, Johnson county, and Sterling, Rice county; as a member of the standing committees of the Faculty on grades and examinations, museums, and catalogue; the charge of the chapel roll upon which the absences of each morning are noted and reported to the President; the oversight of the electric-bell system, the telephone line, and the lines and batteries belonging to the telegraph department proper; and the teaching of classes from three to four hours a day, all makes it seem necessary that I ask that the consideration of the Board be given to the matter of having the work of instruction in the Telegraph Department performed, in part at least, by some one else, thus allowing me more time for necessary work in the Secretary's office.

Besides my regular duties I have taken considerable interest in the successful working of the Scientific Club, which I deem a very valuable adjunct to the regular College work, and of which I have been president during the year.

Also, I prepared two papers for the last annual meeting of the Kansas Academy of Science, at which time I was appointed chairman of one of its sections, with the expectation on the part of the Academy that I should be able to devote sufficient time to a report on the work done in my section for the next annual meeting, to be held in November next.

Respectfully submitted. I. D. GRAHAM.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE SUPERINTENDENT OF PRINTING, 1882–83.

To the Board of Regents:

Gentlemen — Herewith is submitted a report of the Printing Department for the year ending June 30, 1883.

During the year there were enrolled in the class in printing 63 students — 20 ladies and 43 gentlemen. The teaching of those who entered the department for the first time has been essentially the same as heretofore; but the advanced students have had more and better work than in previous years. By the increase in the amount of job type, I have been enabled to give them a greater diversity of work in the line of job work, as well as book work of various kinds. They have been required to do considerable proof-reading and press work, in both of which they have done reasonably well.

Those students who intend to become printers I have encouraged to spend as much time as possible in the office in the afternoon. It is noticeable that those who have availed themselves of this privilege have had no difficulty in securing positions in printing offices elsewhere, at fair wages.

More work has been done in the department during the past year than in previous years. Besides issuing the *Industrialist* every week, the work done is as follows: 10,000 copies of the *Industrialist* were printed in August for advertising purposes; two 16-page pamphlets — one of 200 copies and the other of 300 copies — were printed for the use of the "B" class in rhetorical exercises; a scrap-book of 56 pages; 500 copies of the constitution of the Alpha Beta Society; 300 copies of a pamphlet on Entomology; 4,000 copies of the annual catalogue of the College; 10,000 copies of the *Industrialist* in June for advertising purposes; also all the job work of the different departments, which amounts to considerable in the course of a year.

The following is the financial statement of the department for the year:

	Dr.	*Cr.*
Inventory, June 30, 1882	$1,499 53	
Cash	1,047 41	
Department bills	1 23	
Inventory		$1,540 85
Cash		324 50
Department bills		462 50
Totals	$2,548 17	$2,327 85
Balance		$220 32

Respectfully submitted.

George F. Thompson,
Superintendent.

Manhattan, Kas., June 30, 1883.

REPORT OF THE SUPERINTENDENT OF PRINTING, 1883–84.

To the Board of Regents:

Gentlemen — Herewith is submitted a report of the Printing Department for the year ending June 30, 1884.

Ninety-seven students were enrolled in the class in printing during the year. In the fall term there were enrolled 47—10 ladies and 37 gentlemen; in the winter term, 72—20 ladies and 52 gentlemen; in the spring term, 37—18 ladies and 19 gentlemen. All these classes made fair progress. Of the advanced members of the class, all who have desired them have secured positions for the vacation in printing offices.

For some reason unknown to myself, the number taking printing during the winter term was much greater than ever before. While I managed to find places for them all to work, I could not find the time to give them the attention I desired.

The Printing Department has had, during the year just closed, all the work it could possibly do. Some of the work done is as follows: 500 copies of the constitution of the Webster Society; Synopses of Military Lectures by Lieut. Todd, 40 pages; Campaigns of the Rebellion, by Lieut. Todd, 138 pages, 300 copies; the Webster Biennial Reporter, 100 pages, 200 copies; the "Gleaner Gleaned," by the Alpha Beta Society, 200 pages, 200 copies; lecture, "Seeds," by Prof. Walters; lecture, "The Microscope and its Revelations," by Supt. Graham; Farm Experiments, 48 pages, 5,000 copies; Annual Catalogue of the College, 38 pages, 5,000 copies; two editions of the *Industrialist* — one in August, 1883, and the other in June, 1884 — of 10,000 copies each. These are only the principal jobs.

Following is the financial statement of the department:

	Dr.	*Cr.*
Inventory, July 1, 1883	$1,540 85	
Cash expenses	2,297 97	
Department bills	10 45	
Inventory, July 1, 1884	....	$1,779 65
Cash receipts	....	590 70
Department bills	....	727 75
Balance	....	751 17
Totals	$3,849 27	$3,849 27

Of the expenses, paper cost $715.46; labor, $1,009.25; postage on the *Industrialist*, $26.48; the remaining was for freight, expressage, drayage, type, department bills against Printing Department, and incidentals.

Owing to large classes, it has been necessary to hire all the composition done for the *Industrialist;* and, besides, more type has been set than in previous years. These, with the increased edition of the paper, now about 1,300, explain the increase of the expenses.

The equipment already ordered for 1884–85 will make the office far more effective, while the expenses need not be increased.

Respectfully, GEO. F. THOMPSON.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE INSTRUCTOR IN DOMESTIC SCIENCE, 1882–83.

To the Board of Regents:

GENTLEMEN — I have the honor to present the following report of the work done in my department for the year ending June 30, 1883.

In the Sewing Department there were in the fall term 44 young ladies; in the winter term 35; and in the spring term 24 — making the whole number for the year 103, 18 of whom learned cutting and fitting. There were made in the rooms over two hundred garments, sixty-two of which were dresses.

During the winter term I had a class of fourteen in domestic economy. A lecture of one hour was given each day, and one hour per day was devoted to cooking. There were different kinds of food cooked each week, and disposed of as lunches, at ten cents each, for the students on Friday. The amount paid for these lunches very nearly paid the expenses of the department.

The spring term gave me a class of ten in hygiene, to which a daily lecture was given.

I had also a class in butter making four weeks, during which time they made fifty-five pounds of butter. Respectfully submitted.

MRS. NELLIE S. KEDZIE,
Instructor.

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE INSTRUCTOR IN DOMESTIC SCIENCE, 1883–84.

To the Board of Regents:

GENTLEMEN — I have to submit for your consideration the following report of the work done in the Domestic Department for the year ending June 30, 1884.

During the fall term I taught four classes in sewing, in which I had enrolled 61 students. During the remainder of the year I continued three of these classes, having in the winter term 37, and in the spring term 31 students enrolled, making the whole number in the sewing rooms during the year 129.

In this department the work was carried on as heretofore, and the young ladies made for themselves over three hundred garments, among them ninety-two dresses. During the year twenty-eight young ladies learned cutting and fitting, and many learned fancy work of various kinds. All became accustomed to the use of sewing machines, and many became quite expert in every kind of home sewing.

In the fall term I taught a class in rhetoricals, giving as much drill in recitation as was possible in the semi-monthly meetings, each student being required to commit to memory and recite before the class a selection of either prose or poetry as often as the size of the class would permit.

During the winter term a class of twenty-five young ladies occupied one hour in listening to a lecture on household economy, and a second hour in cooking. For this the class was so large as to require division, and in consequence, I had cooking classes and sewing classes both at the same time — an arrangement which could not give results that were entirely satisfactory.

The class in cooking prepared on each Monday of the term a dinner for several members of the Faculty, at which certain young ladies waited on the table, after serving the dinner, thus obtaining a knowledge of and practice in entertaining guests. The remaining days of the week, besides taking the lectures, each girl did a certain amount of cooking, one division cooking one kind of food all the week, giving each pupil an opportunity to verify with her own hands the receipts she had copied. On Friday, the food accumulating through the week is arranged in lunches, a cup of hot coffee is added, and this is sold to the students, thus partially covering the cost of materials used in cooking.

During the spring term, twelve young ladies composed the class in dairying. This class again took lectures a portion of the term, learning by them the management of milk, the best methods of getting cream, as well as the most approved methods of making butter and cheese.

The class was taken into the dairy, and in the spring term the young ladies made, worked, salted, and prepared for market, seventy pounds of butter. The latter part of the term we devoted a little time to cheese-making, having as the result, six small cheeses.

Much of the time, the supply of milk was very small, and the work was not so interesting in many ways as it might have been. The coming year, with better accommodations in the new rooms for doing work, I hope more milk will be supplied and the work will be more satisfactory to both teacher and pupils.

TABULAR VIEW OF CLASSES.

Sewing, (four classes,)	61
Rhetoricals	32
Sewing, (three classes,)	37
Household economy	25
Sewing, (three classes,)	31
Dairying	12
Total enrolled	198

The following summary will indicate somewhat the direction of the expenditures for the year, the sum against the department in each case referring to the every-day expenditures in repair of general equipment and incidental expenses:

Sewing Department	$17 60
Machine	35 00
Household Economy Department	17 95
Range	40 00
Materials for cooking	116 53
New utensils	37 95
Dairy Department	9 77
Milk	9 55
Total	$284 35

The receipts have been as follows:

From lunches	$57 50
From butter	17 00
Total	$74 50

The inventory of property belonging to this department shows an equipment amounting to $591.60.

Since the Board has employed a teacher for the sewing classes a division of the department will be necessary, and I hope, during the coming year, with less care and fewer classes, more satisfactory work may be done in the new rooms now nearing completion, than has been possible in the old rooms, where inadequate accommodations, in addition to overcrowded hours, have prevented the full accomplishment of results aimed at.

Respectfully submitted. MRS. NELLIE S. KEDZIE.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE MECHANICAL DEPARTMENT, 1882–83.

To the Board of Regents:

GENTLEMEN — I herewith submit the following report for the Mechanical Department, from September 1, 1882, to the year ending June 30, 1883.

On taking charge of the department I made some changes in the arrangement of benches, and made permanent racks for the tools, in place of the temporary boxes which had hitherto been used.

The number of students enrolled during the fall term was 93; during the winter term, 110; and during the spring term, 79. Of these, 5 were in the blacksmith shop during the fall term, 8 during the winter term, and 7 during the spring term. One of the advanced students had these in charge. All others were enrolled as carpenters. No material changes were made in the course of instruction.

The following table will show the financial condition of the department. The inventory of September 1, 1882 was substantially the same as June 30, 1882.

	Dr.	*Cr.*
Cash	$2,214 13	
Inventory, June 30, 1882	1,375 37	
Total	$3,589 50	
Cash		$318 59
Department bills		1,188 63
Inventory, June 30, 1883		1,656 48
		$3,163 70
Balance	$425 80	

The department paid out during the College year, to the instructor in the blacksmith shop, $57.00; for help during the industrial hours, cleaning shop, etc., $31.95. Making a total of $88.95, for which I have received no vouchers.

Improvements in the shop, and materials used by students form the remaining part of the expenditures.

Respectfully submitted. M. A. Reeve,
Manhattan, Kas., June 30, 1883. *Acting Superintendent.*

REPORT OF THE SUPERINTENDENT OF SHOPS, 1883–84.

To the Board of Regents:

Sirs — I herewith submit the following report of the Mechanical Department for the year ending June 30, 1884.

The enrollment for the fall term was 115 students, winter term 119, and for the spring term 57, making a total of 291 for the year. As 93 of these were enrolled for two or three terms, the whole number of individuals amounts to 191. There were 9 students enrolled in blacksmithing.

The course taken in the department has been, as in former years, to give the greatest amount of instruction in the care and use of all the tools and implements used in the various kinds of wood-work, with the least waste of time and materials. In addition to teaching the five classes, my time has been wholly taken up during afternoons, Saturdays and vacations, in superintending the building and repairing of the buildings, sidewalks, farm implements, cabinets, furniture, and fixtures of the several departments, and in all cases students have been employed as much as possible. The amount allowed by the Board last year has been used to replace the worn-out and worthless tools, and make some additions to the stock on hand. An allowance of $250 is respectfully asked for the current year to make still further additions, as the increase of implements has not kept up with the increase in the number of students in the department. The following table will show the financial condition of the department:

BILLS AGAINST THE DEPARTMENT.

Hardware and other supplies	$716 52
Lumber	544 63
Amount paid for students' labor	674 17
Amount paid for men's labor	558 93
Inventory of 1883	1,656 48
Total	$4,150 73

BILLS IN FAVOR OF THE DEPARTMENT.

Received by department bills	$963 98
Received by cash	284 55
Inventory of 1883	2,356 64
Total	$3,605 17
Balance against department	$545 56

Of this balance has been paid:

To Mr. Lund, for instruction in blacksmithing	$32 06
S. N. Peck, for assistance in shop	60 00
Tools and materials for blacksmith shop	25 00
Cleaning shop	35 00
Bills of 1882	58 38
Bills collectible	8 00
Repairs to printing office and shop, not accounted for	58 38
Total	$276 82
Balance	$268 74

This amount was used to pay for help in the general care and repairs of tools and fixtures of shop, repairs to benches, and for materials used by students during hours of practice.

Respectfully submitted. TIMOTHY T. HAWKES.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE INSTRUCTOR IN MUSIC, 1883–84.

To the Board of Regents:

GENTLEMEN — I herewith submit a report of the Musical Department for the two years ending June 10, 1884.

During the year 1882–3 there were assigned to music 55 students — 42 ladies and 13 gentlemen. Of these, 25 received instruction on the piano, 23 on the organ, and 7 on various other instruments.

In the year just closed the number of music pupils was 59 — 44 ladies and 15 gentlemen; 27 took lessons on the piano, 24 on the organ, and 8 on other instruments. The vocal classes were added to my charge this year. Some 75 belonged to these classes. These were divided into two sections, elementary and advanced; each class receiving two drills per week. The progress made was very satisfactory, the classes furnishing a considerable share of the musical part of the commencement exercises.

In addition to this I organized and drilled a small orchestra, which also performed its share in the various public exercises.

The course is adapted to the individual requirements of the student, but all are thoroughly drilled in the proper position of the hand and the various finger movements. A thorough course is provided, consisting of studies by Köhler, Duvernoy, Loeschhorn, Czerny, Heller, Kullak, Bach, etc.

In harmony, a full course is also provided. With present facilities — 4 pianos and 3 organs — from 30 to 35 students can be accommodated at a time. Respectfully submitted. W. L. HOFER,

Instructor.

REPORT OF THE LAND AGENT, 1882–83.

To the Board of Regents:

GENTLEMEN — Find herewith my report for the quarter ending June 30, 1883. The statements and schedules appended will explain the details of the business in my department, and the condition, at this date, of the landed endowment.

The transfer of securities to the State Treasurer on the 31st of March makes it impossible for me to give particulars as to the present value of contracts and notes secured by the lands sold; but the value turned over to the State Treasurer by me March 31st was $93,579.05; turned over for quarter ending June 30th, $20,992.62 — making a total of $114,571.67. This sum, of course, has been reduced by payments maturing during the quarter, but there is probably about $100,000 of these ten-per-cent. securities now in the State treasury.

They constitute a most desirable and safe investment of funds. As there was a complete settlement and balance of my accounts made the 31st of March, except as two items, it does not seem necessary to make a report to cover the entire fiscal year, in detail.

The two unsettled items referred to are contract No. 86, with Jonas Meeker and Chas. N. Sanford, for N.E. ¼ 10–2–2, securing balance due of $1,015. This contract was not perfected at the March settlement. It has since been completed, and turned over to the State Treasurer.

The other item is the case in court of State of Kansas *vs.* Fred. E. Thompson, which involves a claim of $274.62, and interest thereon, represented by a contract entered into at Waterville, May 19, 1880, and the proceedings in the Marshall county district court, based thereon. I have to refer the Board to my report on that case, dated January 9, 1883, and now in possession of your Secretary.

The case stands at this date as it did then. No action has been had. I pass over to the Board of Regents what is left of the F. E. Thompson case· I received it from my predecessor in 1873, and bequeath it as an heir-loom of the College in 1883.

I was instructed by the Board in February, 1883, "to enjoin the officers of Marshall county from issuing a tax deed on S.W. ¼ 15–5–6, the F. E. Thompson tract." As such a step could not well be taken till a deed was about to be issued, I did nothing in the premises. Hon. A. E. Park, of Marysville, who has had charge of the case, and is on the ground, seemed the proper person to continue proceedings. I therefore addressed a letter to him a few days ago, asking him to continue to look after the case, and also to suggest what proceedings should be had. His reply, marked "A," attached hereto, is to the effect that we had better proceed to enforce payment as per contract, and also redeem from tax sale, if we had funds to redeem with. I replied that as he was on the ground and familiar with all the facts in the case and with all proceedings had, I thought we would defer to his judgment as to the steps to be taken; and further, that I would refer his letter and the whole subject to the Board of Regents, which I do herewith.

Agreeably to notice from the Secretary of the Board, I have turned over to my successor, Mr. John B. Gifford, the books and papers belonging to the Land Department, and have taken his receipt for the same, duplicates of which have been filed with the Secretary of the Board. I have also placed in Mr. Gifford's hands a list of the unsold lands, amounting to 8,526.95 acres, with latest prices annexed, in accordance with the twenty per cent. advance ordered by the Board June 15, 1883.

Finally, in making this report, I desire to have my accounts carefully examined, and a statement of the final settlement entered on the records of the Board.

I am respectfully yours,

L. R. ELLIOTT, *Land Agent.*

ANNUAL BALANCE JUNE 30, 1882.

SECURITIES.

Securities on hand June 30, 1882		$79,033 06
Added by sales to June 30, 1883		48,309 72
		$127,342 78
Paid out	$12,496 49	
Delivered to State treasury March 31	93,579 05	
Delivered to State treasury April 30	5,926 69	
Delivered to State treasury May 31	2,142 00	
Delivered to State treasury June 30	11,908 93	
Meeker & Sanford, contingent	1,015 00	
		$127,068 16
Balance, F. E. Thompson suit		$274 62

LANDS.

	Acres.	*Acres.*
Lands unsold June 30, 1882		15,741.72
Sold in quarter ending September 30, 1882	3,151.35	
Sold in quarter ending December 31, 1882	632.37	
Sold in quarter ending March 31, 1883	440.00	
Sold in quarter ending June 30, 1883	2,991.05	
		7,214.77
Unsold June 30, 1883		8,526.95

LAND ACCOUNT, ANNUAL.

	Acres.	*Acres.*
Granted by Congress	....	82,313.53
Patented to June 30, 1883	53,548.40	
Under contract	20,238.18	
		73.786 58
Unsold June 30, 1882	....	8,526 95

LOCATION OF LANDS UNSOLD.

Washington county	3,166.56
Riley county	2,961.33
Dickinson county	2,399 06
Total	8,526.95

MANHATTAN, KAS., June 30, 1883.

REPORT OF THE LAND AGENT, 1883–84.

To the Board of Regents:

GENTLEMEN—I herewith submit my report as Land Agent for the fiscal year ending June 30, 1884.

LANDS SOLD.

Purchaser.	*Description.*	*Acres.*	*Price.*	*Cash.*	*Contract.*	*Total.*
John Nurz	E. ½ N.W ¼, 34, 14, 4	80.00	$7 92	$79 20	$554 40	$633 60
James Nolen	S. E. ¼, 14, 2, 4	160.00	8 64	172 80	1,209 60	1,382 40
John Calvin	S. ½ S. W. ¼, 14, 9, 5	80.00	9 00	90 00	630 00	720 00
Z. W. Cornwell	S. E. ¼, 7, 15, 4	160.00	11 55	231 00	1,617 00	1,848 00
T. A. Hudson	Un. ½ S. W. ¼, 14, 9, 5	80.00	9 00	90 00	630 00	720 00
N. M. Reed	W. ½, 30, 1, 2	305.58	9 57½	365 75	2,560 25	2,926 00
N. M. Reed	E. ½, 25, 1, 1	320.00	8 30	332 00	2,324 00	2,656 00
C. M. Cornforth	S. W. ¼, 19, 1, 2	140.98	9 36	1,319 57	....	1,319 57
Jas. T. Stewart	N. W. ¼, 8, 10, 6	160.00	9 00	180 00	1,260 00	1,440 00
Jacob Matthews	S. E. ¼, 8. 10, 6	160.00	9 00	180 00	1,260 00	1,440 00
Jno. Peterson	E. ½, 38, 5, 5	320.00	9 25	370 00	2,590 00	2,960 00
Clara Hinman	Un. ½ N. W. ¼, 27, 14, 2	80.00	14 00	140 00	980 00	1,120 00
E. K. Felt	N. E. ¼, 7, 4, 5	160.00	9 50	190 00	1,330 00	1,520 00
Mary Kappel	S. W. ¼, 4, 4, 5	160.00	9 00	180 00	1,260 00	1,440 00
E. K. Felt	S. W. ¼, 3, 4, 5	160.00	9 50	1,520 00	....	1,520 00
W. W. Stewart	N. E. ¼, 8, 10, 6	160.00	9 50	190 00	1,330 00	1,520 00
D. M. Beaver	S. W. ¼, 10, 4, 5	160.00	10 50	210 00	1,470 00	1,680 00
S. R. Beaver	N. W. ¼, 9, 4, 5	160.00	10 50	210 00	1,470 00	1,680 00
Ch. Stagedoren	S. E. ¼, 21, 5, 5	160.00	10 00	500 00	1,100 00	1,600 00
K. Wlecke	N. E. ¼, 21, 5, 5	160.00	9 00	820 00	620 00	1,440 00
P. Loughfor	N. E. ¼, 7, 15, 4	160.00	9 50	190 00	1,330 00	1,520 00
S. L. Griffin	N. E. ¼, 22, 9, 5	160.00	9 00	360 00	1,080 00	1,440 00
G. Zabodsky	S. E. ¼, 4, 4, 5	160.00	9 00	180 00	1,260 00	1,440 00
August Peter	N. W. ¼, 28, 15, 4	160.00	9 00	180 00	1,260 00	1,440 00
C. Wingblad	N. E. ¼, 4, 6, 6	164.19	9 00	184 75	1,293 05	1,477 80
August Engel	S. W. ¼, 29, 15, 4	160.00	10 50	210 00	1,470 00	1,680 00
C. Vansiekel	S. W. ¼, 8, 10, 6	160.00	10 50	210 00	1,470 00	1,680 00
Fred. Wendt	S. W. ¼, 28, 15, 4	160.00	10 50	210 00	1,470 00	1,680 00
Daniel L. Morgan	S. W. ¼, 6, 10, 6	164.12	9 00	184 70	1,292 20	1,476 90
Wm. Fiek	S. E. ¼, 19, 15, 4	160.00	11 00	220 00	1,540 00	1,760 00
W. W. Mills	N. W. ¼, 22, 9, 5	160.00	9 00	180 00	1,260 00	1,440 00
Arthur Willey	S. W. ¼, 1, 6, 5	160.00	9 00	180 00	1,260 00	1,440 00
K. L. C. & E. Co	N. W. ¼, 29, 15, 4	160.00	11 00	220 00	1,540 00	1,760 00
K. L. C. & E. Co	N E. ¼, 31, 15, 4	160.00	9 50	190 00	1,330 00	1,520 00
K. L. C. & E. Co	N. W. ¼, 31, 15, 4	159.06	11 00	218 70	1,530 90	1,749 60
Total	....	5,733.93	....	$10,488 47	$44,581 40	$55,069 87

RECAPITULATION.

Number of acres sold	5,733.93
Amount sold for	$55,069 87
Received in cash	10,488 47
Received on contract	44,581 40
Average price per acre	9 60

DEPOSITED WITH STATE TREASURER.

Contracts Nos. 135 to 167, inclusive, amounting to	$44,581 40
Cash	10,488 47
Total	$55,069 87

LAND STATEMENT.

Unsold July 1, 1883, as per report of L. R. Elliott, late Land Agent	8,526.95 acres.
Sold as per report herewith	5,733.93 acres.
Uusold June 30, 1884	2,793.02 acres.

The unsold land is located as follows:

Washington county	640.00 acres.
Dickinson county	800.00 acres.
Riley county	1,353.02 acres.
Total	2,793.02 acres.

The account of $274.62 against F. E. Thompson, explained in the Land Agent's report for 1882–83, is still unsettled, but is likely soon to be paid in full.

Respectfully submitted.

John B. Gifford, *Land Agent.*

Manhattan, Kas., July 1, 1884.

TREASURER'S REPORT, APRIL 7, 1883.

To the Board of Regents:

GENTLEMEN — Herewith I submit for your consideration my final report as Treasurer of the Kansas State Agricultural College, the same embracing the period from the close of the fiscal year ending June 30, 1882, up to this, 7th day of April, 1883:

INTEREST ACCOUNT.

Balance in hands of Treasurer, per his report June 30, 1882	$10,969 23	
Received from all sources since	22,848 02	$33,817 25
Paid approved vouchers to April 7, 1883	$24,986 64	
Paid to Jos. T. Ellicott, Treasurer Kansas State Agricultural College, April 7, 1883	8,830 61	33,817 25

LAND-SALE ACCOUNT.

Balance in hands of Treasurer, per his report June 30, 1882	$20,389 06	
Received from all sources since	44,859 28	$65,248 34
Paid warrants to April 7, 1883	$58,726 00	
Paid State Treasurer March 30, 1883	6,522 34	65,248 34

REPAIRS AND FURNITURE APPROPRIATIONS.

Balance in hands of Treasurer, per his report of June 30, 1882	$66 21
Paid approved vouchers	66 21

CHEMICAL-DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer, per his report June 30, 1882	$148 84
Paid to Jos. T. Ellicott, Treasurer Kansas State Agricultural College, April 7, 1883	148 84

FARM-DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer, per his report June 30, 1882	$33 78
Paid to Jos. T. Ellicott, Treasurer Kansas State Agricultural College, April 7, 1883	33 78

LIBRARY APPROPRIATION.

Balance in hands of Treasurer, per his report June 30, 1882	$0 49	
Received from State Treasurer	1,000 00	$1,000 49
Paid approved vouchers to April 7, 1883	$906 50	
Paid to Jos. T. Ellicott, Treasurer Kansas State Agricultural College, April 7, 1883	93 99	1,000 49

BUILDING APPROPRIATION.

Balance in hands of Treasurer per his report June 30, 1882	$92 95	
Received from State Treasurer	15,000 00	
		$15,092 95
Paid approved vouchers to April 7, 1883	$14,272 33	
Paid Jos. T. Ellicott, Treasurer Kansas State Agricultural College, April 7, 1883,	820 62	
		15,092 95

HORTICULTURAL DEPARTMENT APPROPRIATION.

Balance in hands of Treasurer per his report June 30, 1882	$27 60
Paid approved vouchers to April 7, 1883	27 60

The following securities were on hand and turned over to Treasurer of State on the 30th day of March, 1883, pursuant to an act of the Legislature of the State of Kansas, approved March 6, 1883:

Ten-per-cent. school bonds	$53,294 91
Seven-per-cent. school bonds	113,601 42
Six-per-cent. school bonds	59,164 33
Ten-per-cent. municipal bonds	1,100 00
Eight-per-cent. municipal bonds	5,000 00
Six-per-cent. municipal bonds	52,300 00
Ten-per-cent. real-estate notes and contracts	1,065 00
Eight-per-cent. real-estate notes and contracts	8,175 00
Total	$293,700 66

All of which is respectfully submitted, with the request—this being my final report—that you examine and audit my accounts, and verify the correctness of the same to date. E. B. PURCELL, *Treasurer.*

REPORT OF THE TREASURER, 1883.

To the Board of Regents:

GENTLEMEN—Herewith find my report for the fiscal year ending June 30, 1883:

INTEREST ACCOUNT.

Received of E. B. Purcell, April 7, 1883	$8,830 61	
Farm Department	428 15	
Horticultural Department	240 00	
Executive Department	198 75	
Printing Department	65 45	
Mechanical Department	195 69	
Chemical Department	29 20	
Library Department	1 00	
Domestic Department	10 93	
State Treasurer	7,518 30	
		$17,518 08
Paid approved vouchers		8,084 64
Balance on hand June 30, 1883		$9,433 44

LIBRARY APPROPRIATION.

Received of E. B. Purcell, April 7, 1883	$93 99
Paid approved vouchers	93 99

FARM APPROPRIATION.

Received of E. B. Purcell, April 7, 1883	$33 78
Paid approved vouchers	33 78

CHEMICAL APPROPRIATION.

Received of E. B. Purcell, April 7, 1883	$148 84
Paid approved vouchers	148 84

BUILDING APPROPRIATION.

Received of E. B. Purcell, April 7, 1883	$820 62
Paid approved vouchers	820 62

Respectfully submitted.

J. T. Ellicott, *Treasurer.*

REPORT OF THE TREASURER, 1883-84.

To the Board of Regents:

Gentlemen — Herewith find my report for the year ending June 30, 1884:

INTEREST ACCOUNT.

Balance on hand, July 1, 1884	$9,433 44	
Received from State Treasurer	28,377 83	
" Telegraph Department	14 87	
" Printing Department	372 70	
" Executive Department (including fees)	1,041 05	
" Farm Department	3,361 95	
" Horticultural Department	1,048 90	
" Mechanical Department	284 55	
" Library Department	37 12	
" Chemical Department	45 53	
" Engineering Department	7 00	
" Domestic Department	74 50	
" School District 52, Marshall county	985 00	
		$45,084 44
Paid approved vouchers, July 1, 1883, to July 1, 1884		41,133 37
Balance on hand, July 1, 1884		$3,951 07

APPROPRIATIONS, 1883-84.

LIBRARY.	
Received of State Auditor during year ending June 30, 1884	$500 00
Paid approved vouchers	500 00
FARM.	
Received of State Auditor during year ending June 30, 1884	$500 00
Paid approved vouchers	500 00
NEW BUILDING.	
Received of State Auditor during year ending June 30, 1884	$5,000 00
Paid approved vouchers	5,000 00
FURNITURE AND REPAIRS.	
Received of State Auditor during year ending June 30, 1884	$500 00
Paid approved vouchers	500 00
GREENHOUSE.	
Received of State Auditor during year ending June 30, 1884	$2,500 00
Paid approved vouchers	2,500 00

Respectfully submitted. J. T. ELLICOTT.

MANHATTAN, KAS., June 30, 1884.

REPORT OF THE LOAN COMMISSIONER, 1882-83.

To the Board of Regents:

GENTLEMEN — Herewith find a report of investments made for the endowment fund of the Kansas State Agricultural College from July 1, 1882, to June 30, 1883:

In school bonds, 7 per cent	$8,344 00
In school bonds, 6 per cent	35,504 00
Municipal bonds, bridge, 6 per cent	4,300 00
Municipal bonds, funding, 6 per cent	5,000 00
Total	$53,148 00

All of which is respectfully submitted.

M. L. WARD,
Loan Commissioner.

REPORT OF THE LOAN COMMISSIONER, 1883-84.

To the Board of Regents:

GENTLEMEN — During the year ending June 30, 1884, I have made the following investments on account of the endowment fund of the College:

School bonds, 6 per cent	$27,965 00
Township refunding bonds, 6 per cent	36,000 00
City bonds, 6 per cent	25,000 00
Total	$88,965 00

Respectfully submitted.

J. T. ELLICOTT,
Loan Commissioner.

REPORT OF THE SECRETARY.

To the Board of Regents—GENTLEMEN: The following tables present concisely the financial condition of the College in various aspects not seen from the reports of the College Treasurer or the State Treasurer:

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1882-83.

DEPARTMENTS.	EXPENDITURES.			RECEIPTS.		INVENTORY INCREASE.	ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	Appropriations.	*Income fund.*	*Department transfers.*	*Cash.*	*Department transfers.*			
Instruction		$13,606 68	$500 00				$14,100 68	
Executive	$66 21	5,824 36	31,998 18	$242 65	$1 25	$32,267 17	5,377 68	
Farm	33 78	2,207 52	71 24	1,328 60	172 90	1,348 10		$537 06
Horticultural	27 60	1,730 31	175 00	672 80	1 20	679 35	579 56	
Chemical	148 84	953 32	200 73	140 95	40 35	1,043 02	78 57	
Mechanical		3,198 97	35	303 79	2,046 82	170 95	678 26	
Printing		1,047 41	1 23	324 50	462 50	41 32	220 32	
Telegraph		255 59	22 05	291 00	20 75	58 35		92 46
Sewing		146 53	16 50	59 58		27 50	75 95	
Legal		503 80					503 80	
Mathematical		259 65	32 28			277 50	7 43	
English			1 05				1 05	
Drawing		71 76	227 45			185 18	114 03	
Music		30 40	23 42			64 18		10 36
Library	1,000 49	321 06	351 15	47 75		1,558 12	66 83	
Land		700 65	4 50	6,394 35				5,689 20
Loan		318 04	4 40				322 44	
Military		35 90	4 40			23 05	17 25	
Treasury		1,866 42	3 50	25,356 18	1,712 78			25,199 04
New building	14,272 33				29,179 38	(14,907 05)		
Totals	$15,549 25	$33,071 37	($33,637 43)	$35,162 15	($33,637 43)	$22,836 74	$22,149 85	$31,528 12
Grand totals—Expenditures			$48,620 62		Returns,	$57,992 27		
Balance—Improvement			9,378 27				$9,378 27	

ENDOWMENT FUND—MONTHLY BALANCES, 1882–83.

LAND AGENT.			COLLEGE TREASURY.					TOTAL FUND.			
1882–83.	*Acres of land.*	*Contracts, 10 per cent.*	*Securities, 10 per cent.*	*Securities, 8 per cent.*	*Securities, 7 per cent.*	*Securities, 6 per cent.*	*Real estate.*	*Cash.*	*Productive.*	*Unproductive.*	*Total.*
July	14,606.99	$86,029 50	$59,756 83	$18,200 00	$111,644 94	$78,142 00	$1,712 78	$14,760 98	$353,773 27	$16,473 76	$370,247 03
August	12,949.87	94,751 86	59,642 46	18,200 00	111,984 26	102,302 00	1,712 78	*6,166 49	386,880 58	1,712 78	382,426 87
September	12,590.37	97,310 78	59,442 46	18,200 00	112,659 26	108,039 00	1,712 78	*11,199 41	395,651 50	1,712 78	386,164 87
October	12,590.37	96,420 06	58,731 08	15,700 00	113,201 26	109,039 00	1,712 78	*8,640 31	393,092 40	1,712 78	386,164 87
November	12,278.39	98,291 61	58,429 92	15,700 00	113,602 06	109,164 00	1,712 78	*7,975 60	395,127 57	1,712 78	388,924 77
December	11,958.00	99,542 89	58,239 92	15,700 00	114,632 01	110,164 00	1,712 78	*8,567 79	398,278 82	1,712 78	391,423 81
January	11,958.00	98,012 89	57,016 91	15,700 00	113,956 27	110,164 00	1,712 78	*5,139 04	394,852 07	1,712 78	391,423 81
February	11,758.00	95,983 13	56,187 09	15,700 00	113,601 42	110,064 33	1,712 78	71 06	391,535 97	1,783 84	393,319 81
March	11,518.00	94,868 67	55,459 91	13,175 00	113,601 42	111,464 33	....	6,522 34	388,569 33	6,522 34	395,091 67
April	10,518.31	97,440 61	55,459 91	13,125 00	113,601 42	112,514 33	....	11,035 80	392,141 27	11,035 80	403,177 07
May	10,198 31	94,657 42	48,016 36	13,125 00	111,593 42	116,781 33	....	21,451 54	384,173 53	21,451 54	405,625 07
June	8,526.95	103,637 14	45,524 20	13,125 00	109,907 14	116,805 78	....	21,709 07	397,526 21	21,709 07	419,235 28

* Overdraft.

SOURCES OF INCOME, 1882–83.

FROM INVESTMENTS.	
Interest on bonds, 10 per cent	$6,467 33
Interest on bonds, 8 per cent	363 30
Interest on bonds, 7 per cent	8,504 42
Interest on bonds, 6 per cent	6,199 88
Interest on real-estate securities, 8 per cent	1,127 20
Interest on delinquent interest	592 10
	$23,254 23

From investments	....	$23,254 23
LAND SALES.		
Interest on land contracts, 10 per cent	$8,404 92	
Delinquent interest	91 38	
		8,496 30
COLLEGE DEPARTMENTS.		
Rent of buildings	$209 00	
Fees from students, special	539 25	
Sale of produce, stock, etc	2,663 37	
		3,411 62
Total	....	$35,162 15

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1883.

EXECUTIVE DEPARTMENT.		
Farm and grounds	$25,500 00	
College buildings	69,703 97	
Furniture, fixtures, etc	2,405 65	
Farm, 160 acres, for sale	1,712 78	
		$98,322 40
FARM DEPARTMENT.		
Barns, sheds, etc	$4,600 00	
Furniture and fixtures	373 00	
Teams, horses and mules	540 00	
Cattle, 34 head	6,825 00	
Swine, 29 head	380 00	
Implements, harness, etc	903 30	
Produce in barn	221 00	
Crops in ground	426 40	
Fish ponds	50 00	
		14,318 70
HORTICULTURAL DEPARTMENT.		
Furniture and apparatus	$993 00	
Tools and implements	262 00	
Stock in plantations	1,142 05	
Sundries	129 85	
Team	80 00	
		2,606 90
CHEMICAL DEPARTMENT.		
Physical apparatus	$1,190 80	
Chemical apparatus	789 25	
Chemicals	170 72	
Miscellaneous	1,073 51	
		3,224 28
MATHEMATICAL DEPARTMENT.		
Apparatus, charts, etc	$470 75	
Desk	20 00	
		490 75
MECHANICAL DEPARTMENT.		
Tools, carpenter shop	$969 55	
Tools, blacksmith shop	196 05	
Lumber and other stock	490 88	
		1,656 48
PRINTING DEPARTMENT.		
Presses, type, cases, etc	$1,387 90	
Stock, books, etc	152 95	
		1,540 85
TELEGRAPH DEPARTMENT.		
Line, instruments, etc	$656 45	
Supplies, books, etc	35 40	
		691 85
DOMESTIC DEPARTMENT.		
Kitchen furniture, pantry, etc	$217 85	
Sewing machines, fixtures, etc	285 00	
Dairy apparatus	50 00	
		552 85
DRAWING DEPARTMENT.		
Tables, models, patterns, tools, etc		425 58
MUSICAL DEPARTMENT.		
Pianos, organs, etc	$595 00	
Furniture	23 18	
		618 18
LIBRARY.		
Books and pamphlets	$5,614 07	
Cases, tables, etc	360 00	
		5,974 07
MUSEUM.		
Cabinet and minerals, Chemical Department	$2,241 50	
Cabinet and collections, Horticultural Department	785 00	
		3,026 50
ARMORY.		
Cases, tools, etc		107 65
Total		$133,557 04

The accounts of this office have been greatly increased by the new arrangement as to deposit of funds in the State treasury; still none are kept but such as should always be within reach of the Board. It is now possible to find in the Secretary's office the condition of each fund on any day, the financial condition of each department, the condition of each loan and land contract, and every item of expenditure as well as each item of income during the year.

The work of adjusting these accounts to meet our wants has been a serious addition to the duties of a president, and but for the efficient aid of Supt. I. D. Graham in keeping them, it would have been next to impossible to preserve them in proper order. I trust that the way may soon be open for transferring the responsibility of the Secretary's office to one who can have the necessary time granted for the work.

The balances shown in favor of the income fund are as follows:

In College treasury	$3,951 07
In State treasury	7,886 71
Total surplus	$11,837 68

The appropriations for the current year have all been expended according to the terms of the act, full data being given in the vouchers rendered to the Auditor of State.

An account current is now kept in this office with the State Treasurer, from whose triplicate receipts accounts are made up with the Land Agent, the Loan Commissioner, and each school district and land buyer indebted to the College. It is thus possible for the Board, at any time, to know the exact condition of all funds, and of each loan and contract.

At each quarterly meeting of the Regents all the vouchers are audited and closely compared with the books of the Secretary. Each month the balances of all funds are diligently compared with those given by the several officers interested, and a summary is published in the *Industrialist*.

GEO. T. FAIRCHILD, *Secretary.*

REPORT OF THE SECRETARY, 1883–84.

To the Board of Regents:

GENTLEMEN — The following tables present in concise summary the financial condition of the College, in all its departments, during the year ending June 30, 1884.

ENDOWMENT FUND — MONTHLY BALANCES, 1883-84.

MONTHS.	SCHOOL BONDS.			MUNICIPAL BONDS.			LAND CONTRACTS.	REAL-ESTATE SECURITIES.		ENDOWMENT.			
	10 per cent.	*7 per cent.*	*6 per cent.*	*10 per ct.*	*8 per cent.*	*6 per cent.*		*10 per ct.*	*8 per cent.*	*Cash.*	*Total.*	*Productive.*	*Acres land.*
July	$42,584 44	$107,456 19	$67,061 00	$700 00	$5,000 00	$61,800 00	$104,001 09	$375 00	$8,125 00	$23,766 19	$419,868 88	$396,102 69	8,446.95
August	42,034 44	107,456 19	68,061 00	700 00	5,000 00	61,800 00	102,403 61	375 00	8,125 00	23,863 67	419,868 88	396,005 21	8,446.95
September	42,084 44	107,456 19	68,361 00	700 00	5,000 00	61,800 00	102,205 21	375 00	8,125 00	25,144 47	421,251 31	396,106 84	8,286.95
October	42,004 44	107,456 19	71,846 00	700 00	5,000 00	88,300 00	106,842 38	375 00	8,125 00	791 87	431,440 88	430,649 01	7,200.39
November.	42,004 44	107,456 19	72,296 00	700 00	5,000 00	88,300 00	115,123 44	375 00	8,125 00	5,020 81	444,400 88	439,380 07	5,840.39
December..	41,734 49	106,866 19	72,096 00	700 00	5,000 00	93,300 00	111,479 47	375 00	8,125 00	4,724 73	444,400 88	439,676 15	5,840.39
January....	41,734 49	105,956 19	73,751 00	700 00	5,000 00	103,300 00	116,372 47	375 00	8,125 00	*1,553 27	453,760 88	455,314 15	4,880.39
February...	41,672 69	105,776 57	73,751 00	700 00	5,000 00	108,300 00	113,322 33	375 00	8,125 00	*3,261 71	453,760 88	457,022 59	4,880.39
March.......	41,672 69	105,760 19	73,751 00	700 00	5,000 00	113,300 00	114,552 92	375 00	8,050 00	*3 12	463,158 68	463,161 80	3,916.20
April.........	41,672 69	105,760 19	75,351 00	700 00	5,000 00	113,300 00	114,822 09	375 00	7,950 00	1,464 61	466,395 58	464,930 97	3,592.08
May..........	37,240 78	103,858 19	86,363 52	700 00	5,000 00	113,300 00	112,695 39	375 00	7,950 00	2,332 70	469,275 58	466,942 88	3,272.08
June.........	36,380 78	99,124 19	90,363 52	700 00	5,000 00	113,300 00	113,914 79	....	7,950 00	8,111 90	474,305 18	466,193 28	2,793.02

* Overdraft.

SOURCES OF INCOME, 1883-4.

STATE TREASURY.	
Interest on school bonds, 10 per cent	$3,623 02
Interest on school bonds, 7 per cent	7,882 31
Interest on school bonds, 6 per cent	6,903 64
Interest on municipal bonds, 10 per cent	70 00
Interest on municipal bonds, 8 per cent	400 00
Interest on municipal bonds, 6 per cent	2,405 00
Interest on real-estate securities, 10 per cent	125 84
Interest on real-estate securities, 8 per cent	687 50
Interest on land contracts, 10 per cent	10,255 32
Interest on delinquent interest	285 15
	$32,637 78

COLLEGE DEPARTMENTS.		
From State treasury	....	$32,637 78
Rent of buildings	$372 25	
Special fees from students	580 00	
Sales of produce, stock, etc	5,081 63	
From appropriations	216 35	
From refunded sundries	1,022 94	7,273 17
Total	....	$39,910 95

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1883–84.

DEPARTMENTS.	EXPENDITURES.				RECEIPTS.			ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	Appropriations.	*Income fund.*	*Department transfers.*	*Inventory decrease.*	*Cash.*	*Department transfers.*	*Inventory increase.*		
Instruction		$16,767 22						$16,767 22	
Executive	$500 00	4,795 97	$1,649 96		$461 05	$149 43	$1,355 52	4,979 93	
Farm	500 00	4,899 57	446 50		3,361 95	179 54	2,069 48	235 10	
Horticultural	2,500 00	2,878 82	226 60		1,048 90	1,575 10	3,285 81		$304 39
Chemical		670 73	29 90	845 35	186 53	1,226 25		133 20	
Natural History		381 07	2,991 03				3,234 75	137 35	
Mechanical		2,490 70	2 35		284 55	963 98	700 16	544 36	
Printing		2,297 97	10 45		590 70	727 75	238 80	751 17	
Telegraph		472 83	34 55		235 87	12 65	202 82	56 04	
Domestic		238 23	46 12		74 50		38 75	171 10	
Library	500 00	485 68	146 23		37 12		1,072 20	22 59	
Treasury		3,477 83	50	5,482 37	29,362 83		400 00		20,802 13
Land		63 93						63 93	
Loan		572 13						572 13	
Legal		44 90						44 90	
Drawing		188 04	49 48				199 35	38 17	
Mathematical		61 15	12 90	33 00	7 00	40 00		20 05	
Music		332 90	42 25				355 62	19 53	
Military		13 70	6 50					20 20	
English									
New building	5,820 62					820 62	5,000 00		
Totals	$9,820 62	$41,133 37	($5,695 32)	$6,360 72	$35,651 00	($5,695 32)	$18,153 26	$24,616 97	$21,106 52
State treasury							4,259 95		4,259 95
Grand totals				$57,314 71			$58,064 21	$24,616 97	$25,366 47
Balance				749 50				749 50	

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1884.

EXECUTIVE DEPARTMENT.		
Farm and grounds	$24,500 00	
College buildings	70,949 57	
Furniture, fixtures, etc	2,515 65	
Farm, 160 acres, for sale	1,712 78	
FARM DEPARTMENT.		$99,677 92
Barn, sheds, etc	$5,244 83	
Furniture and fixtures	280 00	
Teams — horses and mules	490 00	
Cattle, 38 head	7,925 00	
Swine, 35 head	565 00	
Implements, harness, etc	863 20	
Produce in barn	222 00	
Crops in ground	367 90	
Fish ponds	125 00	
Wells	155 25	
Note	150 00	
HORTICULTURAL DEPARTMENT.		16,388 18
Furniture and apparatus	$742 25	
Tools, implements, and team	1,154 91	
Stock in plantations	1,223 00	
Greenhouse and stock	3,557 55	
CHEMICAL DEPARTMENT.		6,677 71
Physical apparatus	$1,314 50	
Chemical apparatus	882 40	
Chemicals, etc	1,556 03	
Mineral cabinets	867 50	
NATURAL HISTORY DEPARTMENT.		4,620 43
Tools, etc	$153 15	
Museums, etc	2,802 60	
Museum, Scientific Club	196 00	
Models, etc	83 00	
ENGINEERING DEPARTMENT.		3,234 75
Apparatus, charts, etc	$457 75	
Desk	20 00	
MECHANICAL DEPARTMENT.		477 75
Tools, carpenter shop	$1,181 30	
Tools, blacksmith shop	210 75	
Lumber and other stock	270 98	
Supplies	42 00	
Bills against greenhouse	567 28	
Bills against south wing	84 33	
PRINTING DEPARTMENT.		2,356 64
Presses, type, cases, etc	$1,702 70	
Supplies	76 95	
TELEGRAPH DEPARTMENT.		1,779 65
Line, instruments, etc	$843 32	
Supplies, books, etc	51 35	
DOMESTIC DEPARTMENT.		894 67
Kitchen furniture	$206 40	
Sewing machines and fixtures	328 00	
Dairy apparatus	57 20	
DRAWING DEPARTMENT.		591 60
Tables, models, patterns, tools, etc	$624 93	624 93
MUSICAL DEPARTMENT.		
Pianos, organs, etc	950 00	
Furniture	23 80	
LIBRARY.		973 80
Books and pamphlets	$6,614 07	
Cases, tables, etc	432 20	
ARMORY.		7,046 27
Cases, tools, etc	$107 65	107 65
TREASURY.		
Note	400 00	400 00
Total		$145,851 95

The system of accounts remains essentially the same as for several years past, only extended to meet new wants. The information now at the command of the Board is essentially complete as to each item of expense and investment. Mr. I. D. Graham, Assistant Secretary, will from this date assume responsibility for all the accounts, as provided by the Board at the April meeting. As he has been familiar with all the details from the first inauguration of the system, he is eminently fitted for the task.

Respectfully submitted. GEO. T. FAIRCHILD,
MANHATTAN, KAS., June 30, 1884. *Secretary of the Board.*

APPENDICES.

APPENDIX A.

REPORT OF THE PROFESSOR OF AGRICULTURE, KANSAS STATE AGRICULTURAL COLLEGE, UPON EXPERIMENTS—1883.

In submitting to the public this report of experimental work in the Farm Department, I desire to say that it is not given as representing fully the work of the department. The College farm is not an experimental station, although fairly well equipped for practical and experimental work. Rather the farm is maintained as a part of the educational machinery of the College. Its object is to furnish instruction to the students of the College, no less than to aid, by experimental investigation, general agriculture. It should be said, however, that the policy is to enlarge, as far as practicable, the experimental work of the Farm Department.

The general scope of my work will be understood from the statement that during the year covered by this report, besides having the management of the College farm of 271 acres, including the various experimental undertakings, I have taught large classes in agriculture and stock-breeding, anatomy and physiology, dairying, U. S. history, and rhetoricals.

The substance of the first article on Pig-feeding presented in this report was given in a paper read before the Society for the Promotion of Agricultural Science, held at Minneapolis, Minnesota, last August.

I am under special obligations to Regents Coburn, Kellerman and Gifford, of the Farm Committee, for the hearty interest they have shown, in many ways, in the work of the department; and to students who have carefully worked out much of the details of these experiments.

E. M. SHELTON,
Professor of Agriculture and Superintendent of Farm.

MANHATTAN, KAS., January 15, 1884.

PIG-FEEDING EXPERIMENTS.

The object of this experiment was to ascertain how much, if any, cold weather and exposure during the most inclement season affect flesh-production in fattening pigs. Essentially, the experiment detailed below is a repetition of that made during the winter of 1880–81, a full account of which may be found in the report of the Secretary of the Kansas State Board of Agriculture for 1879–80, page 436.

In the experiments made two years ago, two of the pigs in each series were fed a ration of bran in addition to corn, the object being to determine to some extent the value of bran as an adjunct to corn in feeding. The bran was found to be practically worthless (see Report of the Secretary of the State Board of Agriculture 1879–80, p. 441) to the pigs to which it was fed. This bran ration, however, complicated the experiment in its principal object, so that it has been deemed best, in the experiment under consideration, to employ as feed corn only.

In this experiment ten pure-bred yearling Berkshires were employed, and although of three different but closely related litters, their differences of age in no case equaled a month. The lot was remarkably uniform in appearance, and in the possession of excellent feeding qualities. The uniformity of the pigs, and their excellence for the purposes of this experiment, are further shown by the fact that during the entire period of the experiment none of the pigs were injuriously affected, in appetite or digestion, by the peculiar regimen to which they were subjected.

During the summer preceding the time of this experiment, these pigs were kept in pasture fields which furnished, besides prairie grass, a supply of alfalfa and orchard-grass. In addition to this pasturage, each animal received a daily allowance of one to two ears of corn.

Five of these pigs, Nos. 1 to 5 inclusive, were fed in the basement of a warm stone barn, each pig occupying a separate pen; the remaining five, Nos. 6 to 10 inclusive, were fed in pens in the open yard, without other protection than that afforded by a high board fence on the north of each pen. All of these pigs were fed twice daily — at 8 A. M. and 4 P. M. — and all were given water *ad libitum*. The feed in all cases was shelled corn, which was carefully weighed at each feeding, great care being taken that each animal had all that he could eat without waste. The pigs were weighed at the beginning of the experiment and at the end of each week, and a careful record made of all weighings. The readings of Fahrenheit's thermometer at 8 A. M. daily were also recorded as the temperature of the day. For the "average weekly temperature," the average was taken: not a strictly accurate calculation, but sufficiently so for the purpose of this experiment. In tables Nos. I and II the general results of this experiment from two points of view are summarized.

TABLE NO. I.

Weight of each pig each week of the experiment, the total gain, and total gain per 100 pounds.

DATE.	WEEK OF THE EXPERIMENT.	PIGS KEPT IN WARM PENS IN THE BARN.					PIGS KEPT IN OPEN PENS IN THE YARD.				
		Pen 1.	Pen 2.	Pen 3.	Pen 4.	Pen 5.	Pen 6.	Pen 7.	Pen 8.	Pen 9.	Pen 10.
November 27th	Beginning of the experiment	252	211	223	214	214	200	227	196	237	204
December 4th	1st week	269	222	235	228	228	218	251	216	257	209
December 11th	2d week	275	244	257	253	251	234	270	236	271	232
December 18th	3d week	293	253	268	262	258	244	278	249	288	246
December 25th	4th week	309	271	285	275	295	253	289	241	299	242
January 1st	5th week	315	279	291	285	277	263	299	259	315	261
January 8th	6th week	324	282	305	290	287	262	295	269	321	266
January 15th	7th week	343	301	319	311	296	278	319	276	338	270
January 22d	8th week	346	308	330	322	301	283	323	272	344	275
January 29th	9th week	356	317	337	334	316	283	334	289	360	286
February 5th	10th week	373	330	347	346	322	288	337	283	363	282
Total gain		121	119	124	132	108	88	110	87	126	78
Total gain per 100 pounds		48.00	56.40	55.60	61.50	50.40	44.00	48.40	44.30	53.20	38.20
Average gain per 100 pounds		....	....	54.20	....	....	....	....	45.90	....	....

TABLE NO. II.

Showing the amount of feed consumed each week in each pen, together with the total feed, and average amount of feed for one pound of increase.

WEEKS OF EXPERIMENT.	PIGS KEPT IN WARM PENS IN THE BARN.						PIGS KEPT IN OPEN PENS IN THE YARD.					
	Av. w'kly tem.	Pen 1.	Pen 2.	Pen 3.	Pen 4.	Pen 5.	Av. w'kly tem.	Pen 6.	Pen 7.	Pen 8.	Pen 9.	Pen 10.
1st week	38°	46.50	39.50	47.50	47.50	47.50	31°	48.50	47.50	48.50	50.50	48.50
2d week	34	54.00	59.00	59.00	60.50	60.50	22	63.50	64.00	68.50	65.50	65.50
3d week	35	65.50	66.50	67.00	65.00	65.00	22	64.50	67.50	69.50	69.50	70.00
4th week	42	67.50	66.50	67.50	64.00	68.50	30	64.00	67.50	61.00	74.50	66.50
5th week	32	63.50	65.00	61.50	63.00	59.50	15	63.50	63.50	60.00	74.00	61.50
6th week	22	56.00	56.00	56.00	55.00	54.50	5	55.50	48.00	52.50	66.50	52.00
7th week	29	59.50	58.50	58.50	58.50	59.50	18	55.50	52.00	52.00	72.00	48.00
8th week	19	56.00	55.50	55.00	55.00	50.50	—12	45.00	50.50	43.50	64.50	44.00
9th week	27	51.50	52.50	53.00	53.00	52.50	15	43.50	46.50	46.50	63.00	49.50
10th week	21	57.50	56.00	56.00	53.50	51.00	2	38.50	43.00	43.00	57.00	44.50
Total amount of feed consumed	....	577.50	575.00	581.00	575.00	569.00	....	542.00	550.00	545.00	657.00	550.00
Average amount of feed for one pound of increase	....	4.73	4.84	4.79	4.35	5.26	....	6.15	5.00	6.26	5.21	7.05

TABLE NO. III.

Showing the amount of feed consumed weekly for each 100 pounds of live weight of pig.

WEEKS OF EXPERIMENT.	PIGS KEPT IN WARM PENS IN THE BARN.						PIGS KEPT IN OPEN PENS IN THE YARD.					
	Av. wk. temp.	*Pen 1.*	*Pen 2.*	*Pen 3.*	*Pen 4.*	*Pen 5.*	*Av. wk. temp.*	*Pen 6.*	*Pen 7.*	*Pen 8.*	*Pen 9.*	*Pen 10.*
1st week	38°	17.8	18.6	18.9	21.4	21.0	31°	23.2	19.8	23.5	24.4	23.4
2d week	34	21.3	25.3	23.9	25.1	25.2	22	28.0	24.5	28.9	24.8	29.7
3d week	35	22.6	26.7	25.5	24.7	25.5	22	26.9	24.6	28.6	24.8	29.2
4th week	42	22.3	25.3	24.4	23.8	22.9	30	25.7	23.8	20.8	25.3	27.3
5th week	32	20.3	23.6	21.4	22.5	20.8	15	24.6	21.6	24.0	24.1	24.4
6th week	22	17.7	20.0	18.7	19.1	19.3	5	21.1	16.1	19.8	20.9	19.7
7th week	29	17.8	20.0	18.7	19.4	20.4	18	20.5	16.9	19.0	21.8	18.2
8th week	19	16.2	18.2	17.1	17.3	16.9	—12	16.0	15.7	15.8	18.8	16.1
9th week	27	14.7	16.8	15.8	16.1	17.0	15	15.3	14.1	16.5	17.6	17.6
10th week	21	15.5	17.1	16.0	15.7	16.5	2	13.4	12.8	15.0	15.9	15.6

TABLE NO. IV.

Showing the gain of each pig during each week of the experiment. The numbers having the minus sign prefixed indicate a loss in weight.

WEEKS OF EXPERIMENT.	PIGS KEPT IN WARM PENS IN THE BARN.						PIGS KEPT IN OPEN PENS IN THE YARD.					
	Av. wk. temp.	*Pen 1.*	*Pen 2.*	*Pen 3.*	*Pen 4.*	*Pen 5.*	*Av. wk. temp.*	*Pen 6.*	*Pen 7.*	*Pen 8.*	*Pen 9.*	*Pen 10.*
1st week	38°	17	11	12	14	14	31°	18	24	20	20	5
2d week	34	6	22	22	25	23	22	16	19	20	14	23
3d week	35	18	9	11	9	7	22	10	8	13	17	14
4th week	42	16	18	17	13	17	30	9	11	—8	11	—4
5th week	32	6	8	6	10	2	15	—1	10	18	16	19
6th week	22	9	3	14	5	10	5	10	—4	10	6	5
7th week	29	19	19	14	21	9	18	16	24	7	17	4
8th week	19	3	7	11	11	5	—12	5	4	—4	6	5
9th week	27	10	9	7	12	15	15	0	11	17	16	11
10th week	21	17	13	10	12	6	2	5	3	—6	3	—4

TABLE NO. V.

In which the general results of both series are grouped in periods of one week each.

WEEKS OF EXPERIMENT.	PIGS KEPT IN WARM PENS IN THE BARN.				PIGS KEPT IN OPEN PENS IN THE YARD.			
	Average temperature........	Total feed.........	Total increase...	Corn consumed to produce 1 lb. of increase.....	Average temperature........	Total feed.........	Total increase...	Corn consumed to produce 1 lb. of increase.....
1st week	38°	228½	68	3.30	31°	243½	87	2.79
2d week	34	293	98	2.98	22	327	82	3.98
3d week	35	329	54	6.10	22	341	62	5.50
4th week	42	334	81	4.12	30	333½	19	17.55
5th week	32	312½	32	9.76	15	322½	73	4.41
6th week	22	277½	41	6.76	5	274½	16	17.15
7th week	29	294½	82	3.58	18	279½	68	4.11
8th week	19	272½	37	7.32	—12	247½	16	15.46
9th week	27	262½	53	4.94	15	249	55	4.61
10th week	21	274	58	4.72	2	226	1	226.00
Totals and averages...	....	2,878	604	4.76	....	2,844	479	5.93

From the above tables, we gather by a brief computation that the 2,844 pounds of corn, which in the "outside" pens gave 479 pounds increase in the weight of the pigs, would have given, had it been fed in the warm barn, an increase in the weight of the pigs amounting to 597 pounds. Or, to view the subject from another standpoint, the 479 pounds of increase made in the "outside" pens, would, at the cost of the increase made in the warm barn, namely, 4.76 pounds of corn for one pound of increase, have required the expenditure of 2,280 pounds of corn, plus a fraction, instead of the 2,844 pounds of corn actually fed; showing that the five pigs fed "outside" usd up 564 pounds of corn to furnish heat which had radiated from their bodies into space.

The facts above stated are much more strikingly, and much more fairly shown, if we take, as the basis of our reasoning, the behavior of these experimental pigs during the period of the greatest cold, namely, the 6th, 8th, 9th and 10th weeks. I find, referring to table No. II, that, during this time, the five pigs fed in the yard consumed 997 pounds of corn, and increased in weight 88 pounds. At the same rate of cost of increase, maintained during the same time by the pigs in the warm barn, this 997 pounds of corn would have given 172 pounds of increase. It also follows that the 88 pounds of gain made in this time in the "outside" pens, would, in the warm barn, have required 502 pounds of corn, instead of 997 actually fed "outside;" showing that but little less than one-half of all the corn fed in the "open" yards during the prevalence of the severest cold was employed in keeping piggy's body comfortably warm, and in nothing else.

TABLE NO. VI.

		Total increase......	Total corn consumed......	Corn consumed for each 1 lb. of increase	Increase for each bus. corn (56 lbs.) consumed ....
Period of highest temperature — 1st, 2d, 3d and 4th weeks.	Pigs kept in the barn	301	1,184	3.93	14.23
	Pigs kept in open yards	270	1,245	4.61	12.14
Period of greatest cold — 6th, 8th, 9th and 10th weeks.	Pigs kept in the barn	190	1,086½	5.71	9.80
	Pigs kept in open yards	88	997	11.43	4.90

In the above table, No. VI, a comparison of the pigs kept in the barn, and those in the open yards, is made during the four weeks of highest temperature and the four weeks of the greatest cold.

It was found that during the period of highest temperature, when mild winter weather prevailed, (the average temperature in the barn was 37°, outside 26°,) the pigs in the barn made a much larger increase in weight (31 pounds) than those in the open yards, upon less corn, (61 pounds,) giving a pound of increase for about four-fifths of the corn required by the pigs in the exposed pens. In the period of *greatest* cold this variation is much more marked, except in the total corn consumed, the pigs in the barn consuming 89½ pounds more of corn than those kept outside. The small amount of feed consumed outside, during this period, is safely attributable to the severe weather that prevailed during the time referred to.

The principal results of this experiment may be shown in a few brief comprehensive statements:

1. In the warm barn 2,877½ pounds of corn gave 604 pounds increase in the weight of the pigs, while in the open yards 2,844 pounds of corn gave 489 pounds of increase.

Or, in the exposed pens, the cost of 1 pound of increase was almost twenty-five per cent. greater than the cost of 1 pound of increase in the warm barn.

2. Besides giving less of "total gain" and "gain per cwt." in every pen, during every week of the experiment, the pigs fed outside gave much smaller returns for feed consumed, but this was especially marked during the weeks of lowest temperature.

Thus, during the three weeks of greatest cold, the pigs in open yards required 17.15, 15.46 and 226 pounds of corn for each pound of increase, while in the warm barn, during the same three weeks, 6.76, 7.32 and 4.72 pounds of corn respectively were expended for 1 pound of increase.

3. In this, as in the experiment made two years ago, I have observed that the quietest pigs, the "best feeders," suffered least from cold, ate the best, and gave the largest returns for feed consumed.

4. The fluctuations in the weekly gain were very much greater in the pens in the open yards; but, as shown in table No. IV, whenever little gain, or a positive loss, was sustained—as in the pens 8 and 10 during the 4th week, and pens 6 and 7 during the 6th week—an enormous gain was made during the week following, even though the temperature continued low, as though the animals were making a determined effort to recover lost ground.

5. The fluctuations in the total feed consumed, or in the amount of feed consumed for each 100 pounds of live weight of animal, were not great in the different pens, or in different weeks of each pen, although these fluctuations were greatest in the "outside" pens, the smallest amount of feed being consumed during the coldest weather. It is worthy of remark, however, that in the weeks following, those showing the least gain in flesh or the greatest loss, when the largest increase was made, as stated above, the increase in the amount of feed was inconsiderable: in some cases nothing. Thus in pens 6 and 7 in the 6th week, and in pen 8 in 4th and 8th weeks, the pigs lost 1, 4, 8 and 4 pounds respectively, while in same order consuming 55½, 48, 61 and 43½ pounds of corn. During the week following, when the same pigs gained in weight 16, 24, 18 and 17 pounds, the enormous gain was made at a cost of 55½, 52, 60 and 46½ pounds, respectively, of corn.

TABLE NO. VII.

Showing the general results obtained in both series, in periods of two weeks each.

		Total increase	Corn consumed	Corn consumed for each lb. increase live wt.	Average weight of pigs	Corn consumed for each 100 lbs. live wt.
1st period, 1st and 2d weeks.	Pigs kept in the barn	166.00	521.50	3.14	239.4	43.56
	Pigs kept in the open yard	169.00	570.50	3.37	230.7	49.44
2d period, 3d and 4th weeks.	Pigs kept in the barn	135.00	663.00	4.91	271.5	48.82
	Pigs kept in the open yard	81.00	674.50	8.32	256.7	52.54
3d period. 5th and 6th weeks.	Pigs kept in the barn	73.00	590.00	8.08	292.3	43.62
	Pigs kept in the open yard	89.00	597.00	6.70	273.4	43.66
4th period, 7th and 8th weeks.	Pigs kept in the barn	119.00	567.00	4.76	309.5	36.60
	Pigs kept in the open yard	84.00	527.00	6.27	291.0	36.20
5th period, 9th and 10th weeks.	Pigs kept in the barn	111.00	536.50	4.83	332.5	32.26
	Pigs kept in the open yard	55.00	475.00	8.61	305.0	31.08

From this table we gather certain facts long familiar to attentive feeders of swine, all of which are briefly summarized as follows:

1. That as the pigs became fatter the cost of producing a pound of gain increased, while the total increase made, the total corn consumed, and the corn consumed for each 100 pounds of live weight of animal, progressively diminished.

2. The pigs when consuming the largest amount of feed gave the largest increase for corn consumed, as well as the largest total increase. The line of variation, however, as shown in table No. VII, is never uniform, but is broken from a variety of causes, among which changes of temperature are certainly prominent. Doubtless, had longer periods been taken in the above table (No. VII), these abrupt changes would have been less noticeable, if seen at all.

This experiment agrees in its results with the one made by me two years ago, and both show unmistakably that farmers and stockmen who fail to furnish their swine with proper artificial protection against cold weather, must furnish protection of another kind in the shape of fuel for the "internal fires" of the animal. Which "heating apparatus" is the cheaper, must be decided by everyone for himself; but where, as we have shown, 495 pounds of corn were used in keeping five pigs warm four weeks, there would seem to be no question about the profitableness of employing good, cheap shelter for pigs during the feeding season. May we not also reasonably expect that the facts here adduced hold good in the case of all domestic animals, whether kept for meat or milk, or the work they perform?

For convenience in comparing results, we give below, in tabular form, the general facts growing out of the experiments made in the winter of 1880–81:

TABLE NO. VIII.

		Total pounds corn consumed	Total increase, pounds	Total amount bran consumed	Corn consumed for each 100 pounds of live weight	Bran consumed for each 100 pounds of live weight	Corn consumed for each pound of increase	Bran consumed for each pound of increase
Feed: Corn	Pens 1, 2 and 5 in the barn	2,487	483	....	22.03	....	5.15	....
	Pens 6, 7 and 10 in open yard	2,291	418	....	21.64	....	5.48	....
Feed: Corn and bran	Pens 3 and 4 in the barn	1,589	330	232	21.09	4.13	4.81	0.70
	Pens 8 and 9 in open yard	1,386	240	200	19.82	4.14	5.77	0.83

From the above table is seen that in the outside pens in which corn exclusively was fed, 33.06 pounds more of corn were reduired to produce 100 pounds of increase than in the warm barn; and in those pens in which corn and bran together were fed, the increased cost of producing 100 pounds of increase in the outside pens was 96.19 pounds of corn and 13.03 pounds of bran. This experiment showed, also, a very trifling value for the bran consumed, 8.42 pounds of the corn giving the same increase as 75.78 pounds of bran.

PIG-FEEDING EXPERIMENTS, NO. II.

AN ESTIMATE OF THE VALUE OF MILK TO YOUNG PIGS.

In a previous chapter of this report the results of feeding well-grown pigs during the most inclement season of the year, under different conditions as to shelter and warmth, are detailed. In that experiment, Indian corn was the exclusive diet of the pigs. As first planned, a varied dietary was arranged, in expectation of being able to furnish facts showing the feeding values of different food stuffs. But on reflection this plan was abandoned, the mixed diet in connection with the original object of the experiment (to show the influence of cold and exposure upon the fattening process) involving a problem of too great complexity, when, as in this case, chemical values were not considered. The behavior of the pigs during the experiment, and results obtained, confirmed the general opinion of the excellence of corn alone as food for fattening pigs. That corn in any form is an indifferent food for young and *growing* pigs is a fact supported on equally common experience. I am inclined, however, to go further than this, and assert that none of the common grains, however prepared, will in that critical period of the pig's life, the second, third and fourth months, give that rapid and symmetrical development of the animal sought by all well-informed owners of swine. A continuation of the animal food which nature supplies in the outset of the pig's career, seems to be demanded long after he has acquired a taste for other food. Most breeders of swine will agree with me in this statement; but the question of the *actual* feeding value of milk to young pigs, as compared with some other food stuff, will certainly develop a great variety of opinions. The truth is, that in this, as in every department of agriculture, we need facts upon which to base correct opinions, which in turn will give rise to a rational and profitable system of agriculture. Everyone will agree that milk is a valuable food for young animals; but, when we wish to calculate beforehand which will pay best, to feed the milk of the farm to the pigs, or to convert it into butter or cheese, we can only make a crude guess.

Below are given the principal facts, growing out of an experiment recently concluded in which ten pigs were fed in two sets of five each, one set receiving a ration of fresh milk twice daily in addition to shorts and water, while the other set was limited to a diet of shorts and water.

The pigs employed were pure-breds of the Essex breed, the offspring of stock obtained directly from Mr. Joseph Harris, of Rochester, New York. In this, as in my previous experiments, the pigs were kept singly in pens numbered 1 to 10, inclusive. Without doubt, the results obtained in this experiment would have been more valuable had a larger number of pigs been employed. However, the fact that these pigs were strikingly uniform — all being purely bred and almost identical in blood — makes the facts here obtained of much greater worth than any that might be had from the feeding of a much larger number of ill-assorted animals.

The uniformity of the lot at the beginning of the experiment (July 5) is seen at a glance in the following facts:

No. 1, boar; age, 53 days; weight, 32 pounds.
No. 2, boar; age, 53 days; weight, 32 pounds.
No. 3, sow; age, 53 days; weight, 32 pounds.
No. 4, sow; age, 107 days; weight, 51 pounds.
No. 5, sow; age, 107 days; weight, 63 pounds.
No. 6, sow; age, 53 days; weight, 27 pounds.
No. 7, boar; age, 53 days; weight, 26 pounds.
No. 8, sow; age, 107 days; weight, 50 pounds.
No. 9, sow; age, 107 days; weight, 54 pounds.
No. 10, sow; age, 107 days; weight, 46 pounds.

Numbers 1, 2, 3, 6 and 7 were of the same litter; and numbers 4, 5, 8 and 9 were of another litter.

The pigs were arranged in two sets of five each, Nos. 1 to 5 inclusive receiving milk fresh from the cow and wheat shorts, mixed in the form of slops, Nos. 6 to 10 getting shorts and water in the same form. The pigs were fed twice daily, the feed in all cases being accurately weighed, and great care was taken that each animal received just the amount of feed that he required and no more. All the pigs received whatever water they required. The weight of each pig at the end of each week was taken and recorded. In the following table (No. 1), the general facts of the experiment are stated in the case of each pig, together with the average cost of one pound of increase in both series. In this and in the succeeding tables, the results obtained in pen No. 4 are omitted. The pig occupying this pen was taken with a severe attack of the "thumps" early in the experiment, on which account he was withdrawn.

TABLE NO. I.

Pens.	*Wt. of each pig at beginning of experiment........*	*Wt. of pig at end of experiment....*	*Total gain..........*	*Total gain per cwt..*	*Total feed, lbs.*		*Feed consumed for each 100 lbs. of live weight of pig.*		*Cost of 1 lb. of increase.*		*Average cost of 1 lb. of increase.*	
					Milk....	Shorts..	Milk....	Shorts..	Milk	Shorts..	Milk....	Shorts..
Pen No. 1.........	31	124	93	300	517	247	667.0	318.7	5.55	2.65	5.16	2.60
Pen No. 2.........	32	121	89	278	517	224	673.2	292.8	5.80	2.51		
Pen No. 3.........	32	127	95	296	517	249	650.3	313.2	5.44	2.62		
Pen No. 5.........	63	192	129	204	546	338	428.2	265.0	4.23	2.62		
Pen No. 6.........	27	73	46	170	....	207	....	414.0	....	4.50	....	4.21
Pen No. 7.........	26	76	50	192	....	209	....	409.8	....	4.18		
Pen No. 8.........	50	124	74	148	....	311	....	357.4	....	4.20		
Pen No. 9.........	54	131	77	142	....	326	....	352.4	....	4.23		
Pen No. 10.........	46	122	76	165	....	308	....	366.6	....	4.05		

TABLE NO. II.

Showing the facts of the experiment in both series by weeks, the average feed consumed for each pound of increase, the total feed, total gain, total gain per cwt. of animal.

WEEKS OF EXPERIMENT.	PENS 1, 2, 3 AND 5. FEED: MILK AND SHORTS.						PENS, 6–10. FEED; SHORTS.			
	Total feed.		*Total gain...*	*Total gain per cwt. of pig.........*	*Total feed (lbs.) for 1 lb. increase.*		*Total feed, lbs...........*	*Total gain, lbs.........*	*Feed for 1 lb. increase.....*	*Av. gain per cwt. of pig...*
	Milk.	Shorts.			Milk.	Shorts.				
July 5th–12th, 1st week..........	221	27	23	14.55	9.60	1.17	74	23	3.21	11.33
July 12th–19th, 2d week.........	231	56	58	27.48	3.98	.96	112	27	4.14	11.94
July 19th–26th, 3d week.........	229	84	29	12.13	7.79	2.89	127	23	5.52	9.09
July 26th–Aug. 2d, 4th week...	224	95	44	17.74	5.09	2.15	131	35	3.74	12.68
Aug. 2d–9th, 5th week............	238	110	48	16.38	4.95	2.29	137	27	5.07	8.68
Aug. 9th–16th, 6th week.........	228	127	43	11.94	5.30	2.95	140	40	3.50	11.83
Aug. 16th–23d, 7th week.........	203	131	36	8.93	5.63	3.63	150	34	4.41	8.99
Aug. 23d–30th, 8th week.........	187	143	48	9.85	3.89	2.97	162	26	6.23	6.31
Aug. 30th–Sept. 6th, 9th week..	168	143	36	6.88	4.66	4.66	164	34	4.82	7.76
Sept. 6th–13th, 10th week.......	168	144	41	7.26	4.09	3.51	164	54	3.03	11.44
Total and average results,	2,097	1,060	406	132.14	5.16	2.60	161	323	4.21	....

The above tables furnish the essential facts growing out of this feeding trial. It will not be thought amiss if I go further than the tables, and show some of the facts clearly deducible from them.

As will be observed, the average cost of one pound of increase in the pens in which the feed was milk and shorts was 5.16 pounds of the former, 2.6 pounds of the latter; while in the pens in which shorts alone was fed the average cost of each pound of gain was 4.21 pounds of shorts. It follows from this, then, that 5.61 pounds of milk had in this trial a feeding value equal to 1.61 pounds of shorts; one pound of milk equaling a little less than three-tenths (.287) of a pound of shorts. If we take as the standard of value the price of the shorts, which was $1.00 per cwt., we see that one pound of milk had a feeding value of rather more than one-fourth (.287) of a cent. This estimate, which is based upon *the gross increase* of live weight only, assigns a very low value to milk, and one considerably below that which the dairyman or milk dealer would give it. But the increased gain in the gross weight of pigs here placed to the credit of the milk, really shows but a small part of the work done by it. What may be called the indirect uses of the milk to these young pigs may be concisely stated as follows:

1. In the case of the pigs belonging to the younger litter, those receiving the milk ration were made ripe and ready for the butcher in 100 days; those receiving the shorts alone were quite unsalable at the end of the experiment.

2. The value per pound of the milk-fed pigs was nearly or quite double that of the pigs to which the shorts was fed. I am unable to speak accurately here, for while the pigs which had received the milk sold at the conclusion of the experiment at the highest market price, the pigs which had been fed on the shorts alone, were, with possibly two exceptions, quite unsalable except as "stockers." Indeed, three of these pigs which were turned loose in the yard, where they have been well fed and cared for ever since, do not weigh as much to-day as did their mates, which received the milk ration, at the conclusion of the experiment four months ago.

3. The pigs to which the milk was fed were started upon a career of usefulness; they got an impetus, a momentum, which it is not unreasonable to suppose they would not have subsequently lost had they been kept under ordinary circumstances of feed and care.

4. To the breeder and fancier the advantages obtained by the milk-fed series over the set receiving shorts alone, would have appeared even greated than to the farmer or stock-raiser interested only in pork-making. The pigs receiving the milk were larger of body, and in all respects better and more symmetrically developed than the others. Their skins shone as though they had been oiled; while the series receiving shorts, especially the younger ones, had dull, lusterless, scurfy skins, which gave to them a markedly stunted appearance.

The quality of the flesh of the milk-fed pigs was highly commended by the butchers. It contained a large proportion of lean meat, while the "fat" was well marbled, firm, and of that agreeable nutty flavor which characterizes the best quality of pork. This fat did not waste in cooking — by changing to oil on the application of heat — as corn-fed pork usually does.

From a careful study of all the facts of this experiment, we conclude, and unhesitatingly affirm, that the surplus milk of the farm over and above that used in the family of the farmer can, as prices now are, be more profitably fed to young pigs than applied to any other purpose for which milk is ordinarily sold away from the farm.

EXPERIMENTS WITH FARM-YARD MANURE, SUBSOILING, AND THICK SEEDING OF CORN.

In the spring season of 1883 sixteen plats were laid off in field No. 6 for the purpose of showing the influence upon the corn crop of farm-yard manure, and different methods of seeding and cultivation.

The soil upon which this experiment was made was a strong clay loam, overlying a friable clay subsoil, having a gentle and uniform slope to the west. This ground had been in continuous cultivation for eleven years, during which time it had been manured two or three times, the last time in 1879. A crop of millet was grown upon the land in 1882.

The general plan of the experiment may be stated as follows: the sixteen plats ranged continuously from north to south; each plat was 10½ feet wide by 207½ feet long (one-twentieth of an acre), and every plat was separated from the one nearest it by a two-foot-wide space which was not cultivated. For the purpose of comparison, every plat especially treated was separated from the next of the series by a "nothing" plat, these zero plats in every case being occupied by three rows of corn which received ordinary cultivation. In the plan of the experiment which follows, the position and arrangement of the specially treated plats are shown. The manured plats received well-rotted farm-yard manure at the rate of twenty-eight tons per acre.

The absence of the plats I, J, K should receive a word of explanation. Plats I and K were planted *without* plowing at the time of the planting of the other plats. A succession of warm rainy days, however, which brought the weeds forward in great force, prevented cultivation, and compelled the abandonment of the experiment. These plats, with the "nothing" plat separating them, were plowed up and planted with cow-peas.

In the subsoiled plats the subsoil plow was run to the depth of three or four inches in the furrow, directly in the wake of the common stirring plow working to the depth of six inches.

PLAN OF EXPERIMENT.

SIZE OF PLATS 10½ x 207½ FEET = 1-20 ACRE.

North.

Plat A — 6 rows of corn 1¾ feet apart.
Plat B — nothing.
Plat C — six rows of corn, 1¾ feet apart.
Plat D — nothing.
Plat E — subsoiled.
Plat F — nothing.
Plat G — subsoiled.
Plat H — nothing.
Plat I — nothing.
Plat M — manured.
Plat N — nothing.
Plat O — manured.
Plat P — nothing.

TABLE NO. I.

Names of plats, and their treatment.	*Yield of plat, corn, lbs.....*	*Yield of plat, stalks, lbs....*	*Yield per acre, corn, bu. (70 lbs.).....*	*Yield per acre, stalks, tons...*	*Quality of corn.*
Plat A — six rows, planted 1¾ feet apart	227.5	200.0	65.00	2.00	Poor, half nubbins.
Plat B — nothing	188.5	150.0	53.85	1.50	Good.
Plat C — six rows, planted 1¾ feet apart	233.5	180.0	66.71	1.80	Poor.
Plat D — nothing	194.0	190.0	55.43	1.90	Medium.
Plat E — subsoiled	177.0	152.0	50.57	1.52	Medium.
Plat F — nothing	200.0	168.0	57.15	1.68	Good.
Plat G — subsoiled	177.0	145.0	50.57	1.45	Medium.
Plat H — nothing	177.0	142.0	50.57	1.42	Good
Plat L — nothing	231.0	210.0	66.00	2.10	Good.
Plat M — manured	242.0	240.0	69.15	2.40	Good.
Plat N — nothing	205.0	180.0	58.57	1.80	Very good.
Plat O — manured	187.0	205.0	53.43	2.05	Good.
Plat P — nothing	230.0	197.0	65.71	1.97	Good.

SUMMARY.

	Yield of plat, corn, lbs.....	*Yield of plat, stalks, lbs....*	*Yield per acre, corn, bu., (70 lbs.).....*	*Yield per acre, stalks, tons...*
Plats A and C — corn; drilled in rows 1¾ feet apart	230.50	190.00	65.86	1.90
Plats B and D — nothing; plats adjacent plats A and C	191.25	170.00	54.64	1.70
Plats E and G — subsoiled	177.00	148.50	50.57	1.48
Plats D, F and H — nothing; plats adjacent plats E and G	190.33	166.66	54.38	1.66
Plats M and O — manured	214.50	222.50	61.28	2.22
Plats L, N and P — nothing; plats adjacent plats M and O	222.00	195.66	63.42	1.95

Great care was taken in the arrangement of the experiment that every plat received exactly the treatment accorded to every other — except in the special features of the experiment — in the time of working, amount of seed, and the condition of the crop at the time of harvesting.

The table given above (table No. I) shows, concisely, the yield of each plat in corn and stalks, the yield per acre, the quality of the corn, together with a summary of the yield of the specially treated plats and the "nothing" plats adjacent to them.

The thick-seeded plats were occupied by *six* rows of corn 1¾ feet apart.

In all of the plats the corn was drilled, and, except in the special case, mentioned above, in rows 3½ feet apart. The corn used in this experiment was the medium-sized King Philip variety.

The results obtained in the manured and subsoiled plats will doubtless surprise many. The idea that manure is always useful to crops, and that subsoiling and deep plowing are always beneficial processes, is widely spread. The fact that the labors of the farmer, so far as they affect growing crops, are applied wholly to the soil and subsoil, gives to these factors of the crop an exaggerated importance in the minds of most persons. It is not my purpose in this report to theorize or to explain facts, but to state them. It seems worth while, however, to draw attention here to the fact, that to that other important factor in growth of crops, the season, we must look for an explanation of the peculiarities in the results shown in the above table.

The corn plant is of tropical origin. It revels in hot sunshine and a warm, moist soil. In such a soil it roots deeply, and absorbs rapidly both of water and food. The past season has been one of remarkably low temperatures. According to the records of the Chemical Department of the College, the temperature for June was 2.79 degrees; for July, 5.11 degrees; and for August, 4 degrees — in each case below the average temperature of these months for the past twenty-three years. Now the manure applied in this experiment was put in the bottom of a six-inch-deep furrow; the subsoiling was done at a still greater depth, and the plants failed to get much benefit of either, because the low temperature prevented deep rooting, and it hindered the decomposition of the manure, so that it is more than possible that the manure was a positive loss as shown by plat O.

Dr. Sturtevant, Director of the New York Experiment Station, in one of the bulletins of the Station, refers to a similar experience in his work, as follows:

"In 1883, at no time during the summer did our soil at one inch deep attain a temperature of 90 degrees F. Of the ninety-three observations in July of the temperature at three inches deep, but seven were over 80 degrees; the highest being 84½ degrees, the lowest, 54½ degrees. In August, of ninety-three observations, but three were over 80 degrees; the highest being 85 degrees, the lowest, 54½ degrees. As the temperature for the best root-growth of maize is given by Sachs at 81 degrees, and as absorption of water and food by the plant is less with a low than with a high temperature, it would have been expected that our crops of this year would not have shown to any great extent the effect of applied fertilizer. That this is true reasoning, is evident — not proved — by the results which were as below calculated to the acre from one-tenth acre plants, in bushels of 80 lbs. ear corn:

Fertilizer of preceding year, per acre......	0 pounds.	Yield per acre, 1883	60 bushels.
" " " "	200 "	" "	60 "
" " " "	400 "	" "	61 "
" " " "	800 "	" "	67 "
" " " "	1,600 "	" "	66 "

"In a duplicated series, where potatoes were planted, the same fertilizer in the same quantities being used, the influence of the fertilizer was well marked, *because the potato is a cool-temperature plant.*"

The table shows that the plats in which the corn was drilled in rows 1¾ feet apart yielded 65.86 bushels of corn and 1.96 tons of stalks per acre, while the "adjacent" plats, which held precisely one-half as many rows of corn, gave a yield of 54.64 bushels of corn and 1.70 tons of stalks per acre; a gain for thick seeding of 11.22 bushels of corn and 400 pounds of fodder. These figures should receive the careful consideration of every Kansas farmer. If by planting corn in rows a little nearer each other than is the general practice, we can get even an equal yield of corn as compared with the ordinary method of planting, the method of thick seeding has a great advantage over the common practice, in that the fodder is not only greater in amount, but vastly improved in quality. The great difficulty with corn fodder as ordinarily produced in Kansas is that the very coarse, inedible stalks are greatly in excess of the blades — the really valuable portion of the plant; and, besides, the labor of handling this coarse fodder is very great. Thick seeding in checking the rank growth of the stalk greatly improves the fodder by increasing the proportion of blades to the stalks, in the fodder.

This question of cheap fodder is of prime importance to Kansas agriculture. If by planting corn thickly we can get a very large yield of superior fodder and in addition a good crop of corn, as was obtained in this experiment, even though the corn is inferior in quality, it is proved that corn has scarcely a rival among plants that produce cattle food. As above stated, the quality of the corn yielded in the thick seeded plats was not the best. Perhaps one-half was nubbins. But such corn is well suited to the wants of that large number of cattle feeders who feed their corn with the stalks, directly from the shock.

The labor of cultivation was much less in the thick-seeded plats than in those planted in the common way. The dense growth of stalk and blade completely smothered the growing weeds, thus reducing the work of cultivation to occasional superficial stirring of the surface soil. The hint furnished by this experiment with thick seeding seems to be well worth acting upon by Kansas farmers.

In 1882 an experiment is subsoiling, not before published, was made on ground adjoining that on which the above detailed experiment was made. In this experiment six plats, $\frac{3}{32}$ of an acre each, were used, each alternate plat being subsoiled, the remaining plats plowed simply. All were planted and cultivated at the same time, and in the same ordinary fashion. The annexed table shows the outcome of the experiments so far as the corn product is concerned. The stalks were so severely damaged late in the season, by a violent storm, that no satisfactory record could be made of the yield. A cold backward spring, and the ravages of the cut-worm, are the facts which explain the light yields of the several plats.

TABLE NO. II.

Names of plats, and their treatment.	*Yield of plat; lbs. corn in ear......*	*Yield per acre; bus. of 70 lbs....*
Plat No. 1 — subsoiled	282.0	42.9
Plat No. 2 — nothing	256.0	36.0
Plat No. 3 — subsoiled	262.0	39.9
Plat No. 4 — nothing	233.0	35.5
Plat No. 5 — subsoiled	250.0	38.0
Plat No. 6 — nothing	255.0	38.8
SUMMARY.		
Plats 1, 3 and 5 — subsoiled, average yield	264.6	40.2
Plats 2, 4 and 6 — nothing, average yield	248.0	37.7

The influence of subsoiling is seen in each plat so treated, but that influence, it will be observed, was nowhere very great. If this influence is limited to a single season, the increased yield — two and one half bushels per acre — will not nearly pay the cost of subsoiling.

EXPERIMENTS WITH VARIETIES OF WHEAT.

In the fall of 1881, seventy varieties of winter wheat and eighteen spring sorts were sown in contiguous plats in field No. 6. Of the eighteen spring sorts only six survived the winter, and of these only the Odessa, Improved Fife and White Fife gave fair yields of grain. Of the seventy winter sorts, seventeen seemed especially suited to the conditions of Kansas agriculture, and were reserved for further experiment. (A full report of the behavior of all of these sorts was published in the *Industrialist* of September 19, 1882.) These sorts, namely, Early May, Fluke, German Amber, Finley, Michigan Amber, Champion Amber, Orange, Red Amber, Small Frame, Blue Stem, Red Chaff, Zimmerman, McGhee's Red, Walker, Hungarian, Heige's Prolific and Rust Proof, were sown in adjoining plats — size 10x30 feet — in the fall of 1882. The yield of the several sorts in straw and grain, the estimated yield per acre, the proportion of straw to grain, and the effect of the winter upon most of the sorts, are shown in the subjoined table. By an unfortunate accident in threshing, the identity of a few of the above-named sorts was lost.

TABLE NO. I.

Kinds of grain. (Plats 10x30 feet.)	*Yield of plat, grain, lbs..*	*Yield of plat, straw, lbs..*	*Yield per acre, grain, bu..*	*Yield per acre, straw, lbs..*	*Straw (lbs.) to 1 lb. of grain.....*	*Quality of grain.....*	*Remarks.*
Finley	10.25	27.75	24.80	3,029	2.6	Good	Much winter-killed.
Orange	13.25	36.75	32.06	5,336	2.6	Good	
Red Amber	7.50	22.50	18.15	3,267	3.0	Good	Badly winter-killed.
Small Frame	16.75	28.25	40.53	3,101	1.6	Very good	
Blue Stem	9.75	30.25	23.60	4,392	3.1	Medium	One-half winter-killed.
Red Chaff	12.25	42.75	29.47	6,207	3.4	Poor	Slightly winter-killed.
Zimmerman	7.72	22.25	18.75	3,230	2.8	Good	
Hungarian	9.25	39.75	22.35	5,771	4.2	Medium	
Rust Proof	6.75	32.00	16.33	4,646	4.7	Poor	Much winter-killed.
Walker	11.75	24.50	28.41	3,557	2.0	Good	Badly winter-killed.
Heige's Prolific	7.75	35.75	18.75	3,200	4.6	Medium	

This table teaches, if it teaches anything, the total unreliability of facts based upon a single year's experience.

All of the above sorts, from the experience of one year ago, seemed well suited in all respects to Kansas agriculture. In the experience of the past year, many are seen to be peculiarily susceptible to freezing, others yielding indifferently of grain of inferior quality.

Those old Kansas sorts, Early May — not referred to in the table — Zimmerman and Orange, did not winter-kill or rust, and gave satisfactory yields of grain of excellent quality, as they have done in this section for several consecutive years.

The really excellent crops of grain and straw obtained from varieties that had suffered greatly by winter-killing, as in the cases of the Finley, Blue Stem and Walker, serve to enforce the truth familiar to observant wheat-growers in most sections of the country, namely: that *the crop is largely determined by the character of the spring season.* Now the spring months of 1883 were peculiar on account of the uniform, cool, "backward" weather, which prevailed far into June. This cool weather, with the full average of moisture that accompanied it, was exactly suited to the needs of the enfeebled wheat plants, and the results show that they made the best of their opportunities. Every plant "stooled" amazingly, so that when harvest came the ground seemed occupied with vigorous straw. Had the spring been one of high temperatures and rapid plant growth, the effects of the winter-killing would have been much more plainly shown in the yield.

Another fact of interest observed in connection with the growth of these wheats was the great difference in the tillering habits of the different sorts. The Walker, Blue Stem and Finley "stooled out" wonderfully, while the Rust Proof, Red Amber and some others seemed to possess the tillering habit but feebly. This fact indicates that a material variation in the amount of seed of the different sorts might profitably be made. This tillering habit doubtless explains the large yields from small amounts of seed which are so frequently reported.

WHEAT CONTINUOUSLY ON THE SAME GROUND.

A measured acre of ground in field A has been cropped with winter wheat for three consecutive years, commencing with the fall of 1880. The object of this experiment has been to study the effect upon the ground and crop of continuous wheat-growing upon the same soil, without manures or intervening restorative crops of any kind. The acre in question is a strong clay loam of about average fertility, having a gentle and uniform slope to the east. In 1880 it grew a rank crop of cow-peas, which were plowed under when in bloom. Although the experiment has only been in progress three years, and of course gives small hint of its ultimate outcome, yet the subjoined facts may not prove uninteresting:

YIELD OF ONE-ACRE PLAT OF WINTER WHEAT.

Variety: Early Red May.

Years.	*Yield of grain (bu.)*	*Yield of straw (lbs.)*	*Straw (lbs.) to pound of grain.*
1880–81	9.00	....	....
1881–82	47.00	7,845	2.7
1882–83	28.19	3,281	1.9

THE CULTIVATED GRASSES AND CLOVERS.

My experience with the "tame grasses" in Kansas upon the College farm covers ten years. During this time a very large number of varieties have been tested, some through a series of years, others during shorter periods of time.

I desire in this chapter to state the facts of this experience, in the hope that they may prove useful to the large class of farmers living in the central portions of the State, whom necessity has compelled to seek for some substitute for the rapidly-disappearing native grasses. I wish to say, however, in the outset, that my experience in this section of the State (Manhattan and vicinity) will not prove in all respects a reliable guide to those living along the eastern border, or to those whose farms are in the buffalo-grass region of the west. The kinds of grasses, and methods of cultivation, in vogue in Kentucky and Missouri, are useful in Kansas over a belt of country extending several miles west from the Missouri river. The kinds and methods of cultivation best suited to the wants of the drier portions of the State have not yet been found out. The farmers living in the western, and, so far as the tame grasses are concerned doubtful, region of the State, will do well to give their wild meadows the treatment best calculated to make them permanent. No grasses now known can surpass these native sorts in the ability to withstand drouth and the depredations of insect enemies, and I doubt if any grass known equals them in nutritive qualities and the amount of feed furnished, at least during the summer months.

Many times each year the question is asked me, Can tame grasses be *profitably* grown in Kansas? To this I reply unhesitatingly, that over most of that portion of Kansas lying within one hundred and fifty miles of its eastern border, they can be and are profitably grown. Ten years ago this was one of the open questions. The cultivated grasses were then all but unknown in the newer portions of the State, and were generally considered of doubtful value, if not entirely superfluous. Now these grasses are grown upon a great number of farms in large fields, and by the most thoughtful farmers are considered necessary to the most profitable system of farm management. This shows real progress in agriculture.

THE BEST KINDS.—I do not wish to be understood as saying that there are not peculiar difficulties in the cultivation of the tame grasses in this section of Kansas. Every soil and climate compels certain agricultural conditions and practices in farming, and when, as has been the case in Kansas, these conditions are unknown, we encounter "difficulties." No grass or clover can be permanently successful in Kansas which has not the ability to withstand, without injury, long-continued high temperatures and occasional severe drouths, and in addition it must be a perennial or self-seeding sort. The grasses and clovers which in our experience have shown themselves to possess these qualities in the highest degree are, taking them in the order of their value, alfalfa, orchard-grass, red clover, tall meadow oat-grass, and English blue-grass. For the use of those living in the eastern portion of the State, we should add to this list Kentucky blue-grass and timothy.

THE SOIL AND ITS PREPARATION.— In our experience, the best results have been obtained with most sorts of tame grasses upon a fertile clay loam, resting on a permeable clay subsoil. But, let it be remembered, land can hardly be too rich or too highly manured for grasses. Indeed, we have found that not only are the largest yields obtained upon such fertile lands, but the effect of insect depredations is greatly lessened. Of course, comparatively poor lands, in Kansas as elsewhere, will grow grass; but poor lands produce poor crops everywhere. Better far, commence the growth of the tame species of grass before the land has become impoverished by injudicious cropping.

But whatever may be the character of the soil, prepare it as well and thoroughly, by plowing and harrowing, as for any grain crop. This is a rule with scarcely any exception; and its violation in many ways explains a large proportion of the failures that have attended the attempted cultivation of tame grasses in Kansas. The question is asked us many times every year, Why may I not scatter the seed upon wild sod as is often done in the East? This is often done; but the practice, so far as our experience and observation have gone, has resulted in almost uniform failure. Where the prairie sod has been largely destroyed by the tramping of cattle, we have known blue-grass to succeed partially; but, even in this case, a better sod would have been obtained in less time by thoroughly subduing the land, by two or three years of cropping, before applying the grass seed. As before stated, in the eastern counties of the State, this practice is successfully followed; but even here we are satisfied it would pay the farmer much better, and he would obtain a better sod nearly as quick, if he would take the "wildness" out of the land with two or three grain crops before seeding.

SEEDING WITH GRAIN CROPS.— Oats, wheat and rye are often recommended as excellent crops with which to sow grass seed. The argument is, that the tall grain will shade and protect the young grass. But grass does not need shade when sown in proper season: it needs the sun; and especially it needs moisture, and this the vigorous grain is continually taking from the soil, thus robbing the young grass from the start. Every farmer knows how spindling, sickly, and how lacking in strength of root and stem, is a grass or clover plant growing in a dense mass of grain. When this grain is harvested in June or July, just when the summer heats are greatest, the delicate starved grass plants are certain to perish, unless long-continued, cool and cloudy weather prevents.

We are aware that on favorable seasons, considerable success is obtained by seeding the grass with another crop. But even during these favorable seasons, a better and more vigorous stand may be obtained without the rivalry of vigorous grains; and upon dry seasons, a failure of the grass is almost certain when seeded with a grain crop.

WHEN TO SOW.— The time to sow grass seed is, without exception, in the spring; and recent experience shows that this work should not be undertaken too early in the season. In the spring of 1880, a field seeded early in April came to nothing, the violent dry winds that followed the sowing completely sweeping the seed away. Seed sowed after the spring rains have fairly set in has never failed since 1874 to give a good stand of grass. In a few instances, and where the winter following has been warm and open, we have had good success with timothy and clover sown in fall; but the result of sowing orchard-grass, alfalfa and blue-grass in the fall, has been almost certainly disastrous. My experience with grass seeds sown in the fall has been this: they germinate readily, even more quickly than in spring, but, as the native vegetation fails from the action of frosts, the young grasshoppers collect upon the young grass, doing it serious damage; what remains suffers seriously, and is often quite destroyed by the action of the frosts and violent winds of early spring. On the other hand, when the seeding is done too late in the spring, the young and tender plants are consumed by the sun as fast as they appear above the ground. Seed sown any time during the month of April will rarely fail to germinate and make a vigorous growth. However, I cannot advise seeding, as before said, until the warm spring rains set in. I have sown both alfalfa and orchard-grass during the early part of May with excellent results.

Alfalfa, or Lucern (*Medicago sativa*). For Kansas, but particularly for western Kansas, alfalfa is probably the most valuable of the clovers. In the central and eastern portions of the State, and in the southwestern portion along the Arkansas river, where irrigation is practiced, it has generally proved a most invaluable forage crop. It will prove valuable only in warm climates. North of the parallel 40° north latitude, I should expect it certainly to fail. Alfalfa demands an old, rich soil containing some moisture, a climate, in which, during the summer, blazing suns and an atmosphere heated to the point of suffocation are the rule. Nevertheless, a large portion of those who undertake to grow alfalfa will fail at the first attempt. More accounts come to me of failures with alfalfa, than any other clover or grass that we have had any experience with. Let me emphasize two or three of the matters about which most of these failures cluster. Inquiry into the cause of these has satisfied me that the character of the subsoil has much, perhaps most, to do with success or failure with alfalfa. A soil overlying a tenacious, impermeable subsoil should be avoided in the cultivation of the plant. Prepare the ground thoroughly, by plowing and harrowing. Sow not less than twenty pounds of seed per acre, and sow this about the middle of April, harrow in lightly, following with a roller if possible. Do not be discouraged if the plants make a feeble growth during the first season, as they usually do. Alfalfa should not be pastured or mowed during this first and critical season. The mower should occasionally be run over the ground high enough to miss the alfalfa and cut off the tops of the weeds. After this season, the alfalfa will take care of itself and all the weeds within its reach. Alfalfa is perennial, perhaps eternal; at all events, it will outlive the "oldest inhabitant," if it gets good treatment. The danger which threatens it most is the pocket gopher, which, by burrowing among and cutting the roots of the alfalfa, has destroyed several acres of valuable meadow upon the College farm. Severe cropping by cattle and swine during the summer and late in the fall ought also to be avoided. Alfalfa makes good pastures for stock of all kinds, and is quite unequaled among forage crops for "hog pastures."

It yields enormously of hay — of an inferior quality, I am bound to add. We have cut four crops, of a ton and a half of hay per acre, from the same ground the past year. Nevertheless, in a country which gets its moisture directly from the clouds, it will not pay to raise alfalfa for its hay. Alfalfa should have much field room after cutting. If dried hastily, the valuable portions of the plant, the leaves, will break off in handling and be lost, and only woody, inedible stalks remain. It should be cured slowly in the winrow and "cock," at best a slow operation; and if meanwhile a considerable shower falls, the hay is almost certainly ruined beyond recovery.

Alsike Clover (*Trifolium hybridium*). This clover is highly recommended for wet, heavy lands upon which the ordinary clovers cannot be grown. However, in perfectly dry situations, in seasons favorable to vegetation in general, I have obtained a very large yield of hay upon well-manured clay land. During years of drouth it will kill out seriously. Eight to ten pounds of seed, sown in the spring, should give a sufficient stand.

Bermuda Grass (*Cynodon dactylon*) has been quite extensively introduced into Kansas from southern Missouri and Arkansas during the last two or three years; and extravagant claims have been made for it by interested parties. After three years' experience with this grass on a considerable scale at the College farm, I have no hesitation in saying that for this section — and I am confident, generally throughout the State — it is quite worthless, either for hay or pasture. Of all the "tame grasses," it is latest to appear in the spring, and the lightest frost cuts it off level with the ground. Until the hot weather of June had set in, our Bermuda grass showed scarcely any sign of life and growth. But even then the amount of feed which it furnishes is quite insignificant. Moreover, our stock of all kinds showed no great fondness for it, leaving it always for orchard-grass growing near by. It is possible that in exposed positions, or on poor sandy soils which cannot give support to the more vigorous species, this grass may be useful. It grows vigorously, turning its energies chiefly to the production of root-stocks with which it fills the soil, and — I say it with much regret — it is not apparently injured by our winters. I am confident that our farmers will do well to keep their farms clear of a grass which, like the Bermuda grass, has some of the worst qualities of the most pernicious weeds.

ENGLISH BLUE-GRASS (*Festuca elatior*). In the eastern portions of the State this grass is deservedly a favorite. With us it has been an uncertain crop, yielding largely during seasons favorable to vegetation in general, but suffering from protracted dry weather. I have found two bushels to be sufficient seed for one acre.

FOUL MEADOW GRASS (*Poa serotina*). This old-fashioned sort, long a favorite in New England for wet soils, has done nothing with us, even in a season so favorable for grass as was last year. I doubt if it has any place in Kansas agriculture.

JOHNSON GRASS (*Sorghum halapense*) has been highly recommended for this State. An experience of two years with it does not confirm the good opinions that have been formed of it. In the outset, I experienced a difficulty, common with the seed of this grass — only a small portion germinated. The straggling plants that appeared, however, grew and thickened rapidly, so that the ground was before fall fairly well occupied by the coarse, rank-growing stalks, which finally gave a fair yield of quite inferior hay. In quality, it resembles the coarsest of swale grass. During the winter of 1882–83 the severe weather apparently destroyed it entirely. I was unable after a careful examination to find a single living root. However, in June a few scattering blades appeared, whether from seed or root I am unable to say, and these gradually increased in number during the season.

Our experience with this grass may be summed up in a few concise statements:

1. Good seed is not easily obtained, and damp cold weather rapidly injures it germinating powers.

2. It it one of the latest grasses to appear in the spring, being considerably behind prairie grass in this respect.

3. It is (apparently) destroyed "root and branch" by our severe winters.

4. The quality of the grass seems to be inferior; at all events, our stock has never relished it.

The single fact that Johnson grass makes no growth to speak of before June 1st is is decisive upon its value in Kansas.

KENTUCKY BLUE GRASS (*Poa pratense*). This grass may be grown almost anywhere in the now settled portions of the State. We have never failed to secure a good stand, and ultimately a good sod — even during such very dry seasons as 1875 — when good seed was sown on well-prepared land, and at the proper season, which is in the spring. However, our experience with the grass — a very extended one, by the way — has convinced me that, for all useful purposes except lawns, in central and western Kansas, this is one of the most worthless of tame grasses. It starts early in the season, and for a short time yields a small amount of quite inferior feed; but in May it ripens its seed, the grass becomes brown, dry and fibrous, and in this dormant condition it remains until fall, and often until the following spring. Moreover, dry weather will almost certainly injure blue-grass seriously, when no damage is sustained by orchard-grass and clover in the same field. On the other hand, in the eastern portions of the State, particularly in the counties bordering on the Missouri river, I know from personal observation that blue-grass thrives abundantly, and is a very profitable grass.

I can easily see that this grass possesses great value for a region like Illinois and Kentucky, where winter rains abound, enabling it to make a slow and continuous growth; but the Kansas winter is generally our dryest season, and for this reason I doubt much if this old favorite sort has any place in our agriculture. To obtain a good stand quickly, blue-grass seed should be sown in the early spring; and, in amount, not less than three bushels per acre of ground.

ORCHARD-GRASS (*Dactylis glomerata*). Our first considerable seeding of orchard-grass was made in 1875. During each subsequent year we have sown more or less of this grass, and every season's experience with it has fully confirmed the good opinion which we early formed and have so frequently expressed concerning it. (1) In the ease with which a "stand" is obtained, (2) in its ability to withstand drouth and the ravages of insect enemies, (3) in the abundance of pasturage which it furnishes, and (4) in nutritive qualities, orchard grass is not surpassed by any other sort. In most of these respects, indeed, it is greatly superior to any other grass with which I have experimented. In this section of Kansas I should advise sowing five acres of orchard-grass to one of all other sorts of grasses or clovers.

Orchard-grass is one of the earliest grasses to start in the spring, and the last to succumb to frost in the fall. By giving it a good start in the fall, it will furnish good pasture far into the winter. It is consumed with great relish by stock of all kinds, especially if the grass is cropped short. It seems to do equally well upon heavy clay and sandy soil; and any rich and well-drained soil seems suited to it. It germinates about as easily as oats; and, with good seed, no difficulty is experienced in getting a "stand" that will endure moderate cropping the first fall after seeding. As might be inferred from its common name, it does best when moderately shaded, and is admirably suited to orchard culture; yet there are few grasses that will so well endure the prolonged sunshine of our dry seasons. It should, however, be remembered that orchard-grass will not make a sod as blue-grass does. It always grows in tussocks, or bunches; and, to counteract this tendency, seed should be sown with a liberal hand. Not less than 1½ bushels of seed should be sown per acre; and two would perhaps be better. I have obtained excellent results by adding to the above three quarts of red clover seed. The clover has always thrived with the orchard grass, besides furnishing to animals that variety of food so agreeable to the taste. I have found that orchard-grass is relished even by swine, and therefore it makes excellent "hog pastures." In my experience, too, no amount of tramping or close grazing at any season has been able to injure a well-rooted sod.

Orchard-grass will endure late seeding better perhaps than any other sort; but this operation ought not to be delayed much beyond the middle of April.

TALL MEADOW OAT-GRASS (*Avena elatior*). This old-fashioned English sort has recently been extensively sold in the West under the name of Evergreen Grass. An experience of two years with it enables me to speak very positively of its merits. It yields much more of hay than orchard-grass, but less pasturage. It makes a much more vigorous growth than orchard-grass the first year after seeding, but during the protracted dry, hot weather of last season it showed much less vigor than orchard-grass. Tall meadow oat-grass is well worth a thorough trial at the hands of Kansas farmers. However, it ought to be borne in mind that this sort is still in the experimental stage of cultivation. About two and one-half bushels of seed per acre should be sown.

RED CLOVER (*Trifolium pratense*) deserves a prominent place in the list of forage plants suited to eastern and central Kansas. In 1874 and 1875, two exceptionally dry seasons, it failed almost entirely here, giving neither pasture nor hay. But during the favorable seasons which have since prevailed, it has flourished abundantly, and has yielded more — both of hay and pasture — than is generally obtained in the East. I have in one season cut two excellent crops of hay and a crop of seed from the same ground. Red clover in this State has one interesting peculiarity worth mentioning. When land is once seeded, it never "runs out," as is the case in the East, but thickens and spreads continually by self-seeding. A piece of ground seeded with red clover in 1872 gave a large yield of clover hay last year. I believe that nowhere are such large crops of clover seed grown as in Kansas. Red clover is worth a trial anywhere in the State. Already it has taken a high place in the agriculture of the eastern and central portions of the State, where its cultivation is rapidly extending. In very dry seasons, however, it lacks the "staying" qualities so remarkable in alfalfa. But while drouth generally reduces the yield of clover, as of all other crops, it will rarely, upon clay soil, permanently injure the plants. Regarding the relative merits of clover and alfalfa — a question often raised — I have to say that while clover yields scarcely more than half the hay or pasturage given by alfalfa, in point of quality alfalfa is greatly inferior. The stalks of alfalfa are nearly solid, and woody, and the waste in feeding is great as compared with clover. I am decidedly of the opinion that where clover is successfully grown no farmer will long cultivate alfalfa.

PERENNIAL RYE-GRASS (*Lolium perenne*). The high reputation which this grass has so long enjoyed in Great Britain induced me some years ago to commence on a small scale its cultivation upon the College farm. My whole experience with it is explained in the single word *failure*. During very favorable seasons I have grown moderate crops of hay; but the scant yield of hay and pasturage generally furnished, and its inability to withstand dry, hot weather, stamp perennial rye-grass as peculiarly unsuitable to the wants of Western farmers.

TIMOTHY (*Phleum pratense*). This sort, so valuable in the East as a mowing grass, has upon the College farm shown itself almost continually inferior to most of the foregoing, in the following important respects: it gives no crop during dry seasons, and during seasons of severe drouth kills out severely, while its yield is light, even under favorable circumstances. Moreover, it suffers greatly from the attacks of insects. After an experience of ten years with this grass in Kansas, I am abundantly satisfied that there are few situations in Kansas where timothy can be profitably grown. We need, above any other, forage pasturage; and this, assuredly, timothy does not furnish.

The above-mentioned grasses and clovers are only a very small part of the total number that have been tested upon the College farm. They are, however, the sorts that either have proved most useful, or are most likely to receive a trial by inexperienced farmers.

The table given below may not be without interest as showing the yield at a single cutting of different grasses and clovers during the favorable season of last year. These sorts were grown in plats side by side, all receiving precisely the same treatment. A square rod of each was cut on June 18th. The cut grass was spread and exposed to the hot sun exactly forty-eight hours, when it was gathered and weighed. The different kinds, although generally in the condition of excellent hay, varied a good deal in quality. Nearly all might advantageously have been further reduced by evaporation fully twenty per cent.

VARIETIES.	*Weight of grass (lbs.) per rod*	*Weight of hay (lbs.) per rod*	*Yield per acre (lbs.) of hay*	*Pounds green grass to one of hay*
Alfalfa	93	24	3,840	3.8
Alsike clover	133	34	5,440	3.9
English blue-grass	98	24	5,848	4.0
Foul meadow grass	94	29	4,640	3.2
Orchard-grass	89	32	5,120	2.8
Red clover	154	39	6,240	4.0

THE CULTURE OF THE MANGEL WURZEL.

A considerable experience in growing mangel wurzels and sugar beets upon the College farm during several widely-different seasons, has convinced me that Kansas farmers have in these roots an easily-cultivated field crop, and a cattle food that is admirably calculated to supplement the stimulating corn diet so generally used by our feeders during the winter season. Probably the mangel is the best, if not the only one of the "root crops" suited to the warm, dry climate of Kansas. During several seasons we have tried the Swedish turnip, but have never yet succeeded in making even a moderate crop. Not so with the mangel wurzel. Even in such exceptional seasons as 1874, when combined drouth and grasshoppers effected the total destruction of the corn crop, we grew nearly three hundred bushels per acre of excellent mangels. During subsequent favorable seasons, we have with ordinary cultivation made crops of six or seven hundred bushels per acre. With special care and attention, probably crops double, or even treble the above amounts might be grown. I wish here to call attention to a few of the matters which the Kansas farmer who cultivates mangels will do well to look to.

A common mistake is made in using the coarse "mammoth" sorts of mangels and sugar beets. It will always be found that these overgrown kinds, although yielding more largely than the finer-grained "globes," are really much less profitable. They are more difficult to cultivate, and especially to harvest, and their coarse, spongy texture, and the large cores which they almost certainly contain, render them peculiarly liable to decay. We have also found these coarse beets to be less sweet, and less relished by stock than the smaller and finer kinds. We have had excellent success with the Yellow Globe Mangel as improved by Mr. Joseph Harris. The crop has been large and easily cultivated and harvested, while in respect to quality they are second to no other mangel. Lane's Improved Sugar Beet has, with us, justified the good opinions which have so often been expressed of it. Kansas farmers will find both of these sorts incomparably better than the coarse-growing varieties generally cultivated.

The field management of mangels presents but few difficulties. The soil should be of a good degree of fertility to begin with, but manuring, and especially thorough plowing and cultivation, can hardly be overdone. At least three pounds of seed per acre should be drilled in rows thirty inches apart. It is especially important in Kansas that the seed be sown early. This operation ought not to be delayed much beyond May first. The plants should be thinned out to spaces ten or twelve inches apart. If blank spaces appear in the rows, they should be filled by transplanting. A crop of mangels puts the land in the best possible condition for succeeding crops, simply because a crop of mangels and another of weeds cannot be grown upon the same land at the same time.

The storing and preservation of mangels is another stumbling-block to beginners in root-culture. Our experience has shown that mangels grow late in the season, enduring without injury, a large degree of frost. For this reason, and because if pitted before the warm weather has ended they are almost certain to rot, the work of harvesting should be delayed to as late a period as is consistent with safety. Last season we finished harvesting mangels on November 12th. Mangels may be best preserved in pits, or rather in piles, for only the most superficial excavations need be made for them. A light coating of straw on the piles of roots is sufficient when first put up; afterwards earth may be added, as the severity of the season increases.

Since losing a valuable Jersey cow in 1875 by choking with an irregular-shaped piece of mangel, we have taken special care to minutely and uniformly slice all roots before placing them before cattle. There are various cheap machines which will do this work well, and with the expenditure of little power. The quite common practice of slicing roots with a shovel in a tub or other vessel is a dangerous one, because it is nearly impossible to reduce the pieces to uniform fineness, and these coarse pieces are a prolific cause of choking.

The feeding value of mangels is well understood. A simple test applied last winter in the case of a milch cow illustrates the value of mangels quite forcibly. A Shorthorn cow was fed morning and night for five successive meals four quarts of corn chop, with a uniform ration of hay. At corresponding milkings she gave 15½, 17, 16½, 18, and 19 pounds of milk, an average of 17½ pounds of milk to the milking. The feed of the cow was then changed to one half-bushel of mangels morning and evening, with the same hay ration as in the preceding trial. The result was seen in a yield of 20, 19, 16½, 19 and 18 pounds of milk respectively at five successive milkings, an average of 18⅗ pounds of milk to each milking. On account of the uses to which the milk was put, it was impossible to ascertain the amount of cream yielded by the two kinds of feed. The fact, however, that the half-bushel of mangels gave a larger flow of milk than four quarts of corn chop, is sufficient to show, without referring to the excellent sanitary influence of roots, the great feeding value of these roots.

THE CARP AS A FARM FISH.

Our experience with the German carp began in April of 1881, when some 30 young fry of scale carp were received from the United States Fish Commissioner at Washington. These were placed in a shallow pond, having a superficial area about 12 by 30 feet, which had been hastily excavated for their reception. The fish were occasionally fed, sometimes at intervals of two or three days, but often as many weeks would elapse without any food having been supplied them by artificial means. The feed used was scraps of bread and other vegetable food from the table, and occasionally corn-meal mush, prepared especially for them.

From the time the fish were placed in the pond, they were rarely seen. Pieces of bread thrown in the pond would bring them to the surface, but their favorite position seemed to be near the bottom of the pond, the mud of which they seemed to be almost continually turning up. In the summer the pond became greatly reduced by evaporation, until it held scarcely six inches deep of water. Nevertheless, and although the pond was absolutely devoid of grass and other ordinary vegetable growths, the carp thrived and grew amazingly. This growth is shown by the following figures:

Date of weighing.	*Length of carp, inches.*	*Weight of carp, ounces.*
April, 1881	2	....
October, 1881	13	24
April, 1882	13	24
October, 1882	18	40
October, 1883	18	40

It is seen that no growth was made in either winter season, or during the entire year past. This latter fact is probably explained by the facts that the fish bred enormously during this year, and were badly crowded in ponds containing but little vegetable growth.

In the summer of 1881, a second and deeper pond was dug, which has since been used for the winter quarters of the fish. This pond is about 30 by 30 feet, and holds, when full, three feet deep of water, an amount which experience has shown to be sufficient to prevent the complete freezing of all the water in the pond. During the entire winter this pond has been, apparently, a solid mass of ice; and although during the past winter, by an accident to a sluice, the water drained out from beneath the ice, leaving scarcely six inches of water in the pond, no harm came to the fish.

At one year old, our carp bred, but the increase was slight. During the summer of 1883, however, they increased enormously, the produce numbering thousands, which in many cases were four inches in length before fall.

I wish to emphasize a few of the considerations that must be heeded by the beginner who would be successful in carp-raising:

1. The supply of water for the pond must be under perfect control. If the pond is subject to overflow, the carp will almost certainly be carried away by the first freshet. If, on the other hand, an uncontrolled flow of water enters the pond, there is danger from the entrance of such enemies as minnows, sunfish, snakes, and turtles. The pond, or ponds — for there ought to be at least two, one for breeding and the other for store fish — should be generally shallow, abounding with deep holes.

2. The enemies of carp in Kansas are chiefly the various predaceous fishes, turtles, snakes, wild ducks, and the bird known as the king fisher. The finny enemies of carp must be kept away by a wire gauze, intersecting the stream feeding the pond. The turtles may be caught with fish-hook and line, and the gun will be found efficient against turtles, snakes, and birds. Of all the enemies of carp, turtles have proved by far the most dangerous.

3. If the pond abounds in grass, flags, or weeds in quantity, the fish do not need to be supplied with food. But even where the pond furnishes good feeding-grounds for the fish, a regular artificial supply of food will aid in giving the fish early and rapid development.

There is much dispute about the eating qualities of carp. By some it is claimed that carp are equal to salmon or trout in edible qualities, while others pronounce them to be totally inferior in flavor and quality. Probably the treatment the fish have received, and more especially the character of the soil underlying the pond in which the fish have been kept, the age of the fish, and mode of cooking, all influence the quality of the carp, and thus produce these divergent opinions regarding them. Carp have not proved with us to be the best flavored fish, but they are greatly superior to buffalo fish, catfish, and most of our native fish, in quality and flavor. They are a bony, tolerably firm, fat fish, and the flavor, while quite pronounced, is not disagreeable. They will prove a welcome addition to the daily fare of most of the Kansas farmers who give them a trial.

THE PERIOD OF GESTATION IN COWS.

For upwards of ten years, the College herd of neat cattle has embraced three, and during a portion of the time four, breeds. These cattle are kept for various uses — as illustrative apparatus, for experimental purposes, and, to some extent, for profit. But whatever their uses, a careful record is kept with all, and from this record the following facts are collated. My desire is, for various reasons, to have all cows drop their calves in the months of September and October; and, while this is not always practicable, it is probably true of the periods given below, that four-fifths include the spring and summer months.

YEARS.	DAYS OF GESTATION.				
	Shorthorns..	*Jerseys......*	*Galloways...*	*Devons......*	*Angus.......*
1874	273	....	....	289	....
1875	285	279	286	288	....
1876	279	285	284	286	....
1877	280	281	287	....	....
1878	273	278	282	....	....
1879	278	....	....	....	....
1880	280	276	....	....	....
1881	282	275	....	....	....
1882	284	277	288	....	277
1883	284	....	....	....	....

SUMMARY.

Breeds.	*Number of bulls........*	*Average number of days...*	*Number of heifers........*	*Average number of days...*
Shorthorn	17	281	20	282
Jersey	4	281	10	277
Devon	3	289	1	286
Polled-Angus	1	278	1	275
Galloway	3	286	2	285

Longest period, a Shorthorn, 290 days.

Shortest period, a Jersey, 268 days.

Mean of all, 62 periods, 281 days.

The above table certainly shows that the fluctuations on account either of breed or sex are slight, although the statement of Mr. Darwin of observations made in Germany, that "the period of gestation is longer in large-sized than in small-sized breeds of cattle," gets slight support from it. The uniform condition which our cows have maintained as a result of the uniform treatment that they have received, doubtless explains the uniformity of their periods of calf-bearing.

In the oft-quoted facts furnished by Lord Spencer, the shortest period of gestation in 764 cows was 220 days, and the longest 313 days, while the average period was 285 days.

APPENDIX B.

LIST OF TREES AND SHRUBS GROWN FOR EXPERIMENT AT THE KANSAS STATE AGRICULTURAL COLLEGE. (June 30th, 1884.)

The following lists of the ornamental and fruit trees and shrubs now growing on the College grounds are presented as a report upon the progress of experimental planting, and as a basis for comparison in future reports. The totals of each list may be here given:

	Sorts.		*Sorts.*
Ornamental trees and shrubs	210	Cherries	7
Apples	219	Grapes	39
Pears	82	Raspberries	23
Peaches	38	Blackberries	17
Plums	11	Currants	7
Apricots	9	Gooseberries	4

E. A. Popenoe,
Superintendent of Orchards and Garden.

LIST OF ORNAMENTAL TREES, SHRUBS AND VINES NOW GROWING ON THE GROUNDS OF THE STATE AGRICULTURAL COLLEGE.

CONIFERS.

Abies excelsa	Norway Spruce.
Juniperus Virginiana	Red Cedar.
Larix Europæa	European Larch.
Pinus Austriaca	Austrian Pine.
pumilio	Dwarf Mountain Pine.
pungens	Table Mountain Pine.
rigida	Yellow Pine.
sylvestris	Scotch Pine.
Strobus	White Pine.
Salisburia adiantifolia	Gingko Tree.
Taxodium distichum	Bald Cypress.
Thuja occidentalis	Arborvitæ.

DECIDUOUS TREES AND SHRUBS.

Acer platanoides	Norway Maple.
saccharinum	Sugar Maple.
Tartaricum	Tartarean Maple.
dasycarpum	Soft Maple.
dasycarpum var	Wier's Cut-leaved Maple.
pseudoplatanus	Sycamore Maple.
species indet.	
Akebia quinata	Japan Akebia.
Althæa frutex	Althæa ("Rose of Sharon") 4 sorts.
Ampelopsis quinquefolia	Virginia Creeper.
Veitchii	Japan Creeper.
Amygdalus Persica	Double-flowering Peach, white.
" "	Double-flowering Peach, rose.
" "	"Golden Cuba" Peach.
" "	"Golden Beauty" dwarf Peach.

Amygdalus Persica	"Blood Leaf" Peach.
‘‘ ‘‘	"Poplar" Peach.
Aralia hispida	Prickly Aralia.
Ailanthus glandulosa	Ailanthus.
Æsculus glabra	Smooth Buckeye.
Amelanchier Botryapium	Service Tree.
species?	Dwarf June Berry.
Berberis communis	Common Barberry.
communis, fr. violacea	Purple-fruited Barberry.
communis, purpurea	Purple-leaved Barberry.
dulcis	Evergreen Barberry.
Betula alba	White Birch.
lenta	Yellow Birch.
Bignonia radicans	Trumpet Creeper.
atroviolacea	Purple Trumpet Creeper.
Caragana arborescens	Siberian Pea Tree.
Carya Americana	Shellbark Hickory.
olivæformis	Pecan Hickory.
Castanea vesca	Chestnut.
pumila	Chinquapin.
Catalpa Kœmpferi	Japan Catalpa.
bignonioides	Common Catalpa.
bignonioides, var. speciosa	Hardy Catalpa.
bignonioides, var. aureo-variegata	Golden Catalpa.
bignonioides, var. ———	Teas's Hybrid Catalpa.
Clethra alnifolia	Sweet Pepper-Bush.
Cerasus avium, fl. pl	Double-Flowering Cherry.
Mahaleb	Mahaleb Cherry.
Virginiana	Wild Black Cherry.
serotina	Choke Cherry.
Celastrus scandens	Bittersweet.
Celtis occidentalis	Hackberry.
Cephalanthus occidentalis	Buttonbush.
Cercis Canadensis	Redbud.
Chamæcerasus sempervirens.	
Chionanthus Virginiana	White Fringe.
Cotoneaster Simonsii.	
species?	
Corchorus Japonicus.	
Cornus sanguinea	Red-twigged Dogwood.
florida	Flowering Dogwood.
Sibirica	Siberian Dogwood.
Corylus Americana	Hazel.
avellana	Filbert.
Cratægus Crus-galli	Cockspur Thorn.
Oxyacantha	Hawthorn.
tomentosa?	Red Haw.
species?	
species?	
Cydonia Japonica	Japan Quince.
‘‘ var. umbilicata	Rose-flowered Japan Quince.
Deutzia scabra	Rough Deutzia.
crenata flore-pleno	Double Deutzia.
Eleagnus hortensis.	
Euonymus atropurpureus	Wahoo, Staff Tree.
Japonicus	Evergreen Euonymus.
Fontanesia filariæfolia.	
Forsythia Fortunii	Fortune's Golden Bell.
suspensa	Weeping Golden Bell.
viridissima	Green Golden Bell.
Fraxinus viridis	Green Ash.
Americana	White Ash.
excelsior	European Ash.

Fraxinus excelsior, var. aurea	Golden European Ash.
excelsior, var. monophylla	Single-leaved European Ash.
lentiscifolia.	
Gleditschia triacanthus	Honey Locust.
Gymnocladus Canadensis	Coffee Bean.
Hypericum calycinum	St. John's Wort.
species ?	
Ilex vomitoria	Holly.
(Prinos) verticillata	Winter Berry.
Itea Virginica.	
Juglans nigra	Black Walnut.
cinerea	Butternut.
regia	English Walnut.
Köhlreuteria paniculata	Köhlreuteria.
Ligustrum Sinense	Chinese Prim.
vulgare	Common Prim.
ovalifolium	Broad-leaved Prim.
Liquidambar styraciflua	Blue Gum.
Liriodendron tulipifera	Tulip Poplar.
Lonicera Ledebouri	California Honeysuckle.
Tartarica	Red Tartarean Honeysuckle.
Tartarica alba	White Tartarean Honeysuckle.
fragrantissima	Fragrant Honeysuckle.
Halliana	Japan Fragrant Honeysuckle.
sempervirens	Trumpet Honeysuckle.
flava	Yellow Trumpet Honeysuckle.
brachypoda, var. aureo-reticulata	Japan Golden-leaved Honeysuckle.
Xylosteum, var. "Philomela,"	English Bush Honeysuckle.
Maclura auriantiaca	Osage Orange.
Menispermum Canadense	Moonseed Vine.
Morus alba	White Mulberry.
alba, var. fastigiata	Upright White Mulberry.
alba, var. multicaulis	Downing's Everbearing Mulberry.
alba, var. ———	Russian Mulberry.
rubra	American Red Mulberry.
Negundo aceroides	Box Elder.
Opuntia arborescens	Tree Cactus.
species ?	Prickly Pear Cactus.
Paulownia imperialis	Paulownia.
Philadelphus coronarius	Common Mock Orange.
grandiflorus	Large-flowered Mock Orange.
Yokohama	Japanese Mock Orange.
dianthiflorus fl. pl	Double Mock Orange.
deutziæflorus fl. pl	Double Mock Orange.
Platanus occidentalis	Sycamore.
Populus pyramidalis	Lombardy Poplar.
alba	Silver Poplar.
splendens.	
angustifolia	Willow-leaved Poplar.
monilifera	Common Cottonwood.
certinensis	Siberian Poplar.
Nolestii	Siberian Poplar.
candicans	Balm of Gilead Poplar.
Populus rotundifolia	Round-leaved Poplar.
varieties not named.	
Prunus Sinensis	Double-flowering Plum.
Simonii	Japanese Plum.
Chicasa	Chickasaw Plum.
Americana	Red and Yellow Plum.
Japonica, fl. pl., alba	White-flowering Almond.
Japonica, fl. pl., rosea	Pink-flowering Almond.
Ptelea trifoliata	Wafer Ash.
Pyrus arbutifolia	Chokeberry.
aria	White Bean.

Pyrus spectabilis, fl. pl	Double-flowering Apple.
Aucuparia	European Mountain Ash.
Aucuparia, var. quercifolia	Oak-leaved Mountain Ash.
Phellodendron Amurense	Siberian Cork Tree.
Rhamnus catharticus	Buckthorn.
utilis	Buckthorn.
Rhus cotinus	Purple Fringe.
radicans	Poison Ivy.
Ribes floridum	Wild Currant.
aureum	Yellow-flowering Currant.
rotundifolium	Wild Gooseberry.
Robinia hispida	Dwarf Rose Locust.
Robinia Pseud-acacia	Black Locust.
Rosa setigera	Michigan Rose.
blanda	Common Wild Rose.
rubiginosa	Sweet Brier.
And many garden varieties.	
Rubus odoratus	Fragrant Bramble.
spectabilis	Showy Bramble.
occidentalis	Wild Black Raspberry.
Canadensis	Wild Blackberry.
Salix fragilis	Brittle Willow.
laurifolia	Shining Willow.
capræa	Goat Willow.
longifolia	Long-leaved Willow.
nigra	Common Willow.
triandra	Osier Willow.
viminalis	Osier Willow.
vitellina	Golden Willow.
species?	Wisconsin Weeping Willow.
species?	Japan Weeping Willow.
Sambucus laciniata	Cut-leaved Elder.
Canadensis var	Variegated Elder.
Sophora Japonica	Japan Sophora.
Spiræa Billardii	Rose Spiræa.
callosa	Fortune's Spiræa.
callosa alba	White Spiræa.
callosa semperflorens	Dwarf Spiræa.
lanceolata	Lance-leaved Spiræa.
opulifolia, var. aurea	Golden Spiræa.
prunifolia fl. pl	Bridal-wreath Spiræa.
Thunbergii	Thunberg's Spiræa.
Van Houttii	Van Houtt's Spiræa.
sorbifolia	Sorb-leaved Spiræa.
Staphylea trifolia	Bladder Nut.
Symphoricarpus vulgaris	Coral Berry.
vulgaris, variegatus	Variegated Coral Berry.
occidentalis	Native Snow Berry.
racemosus	European Snow Berry.
Syringa vulgaris	Common Lilac.
vulgaris alba	White Lilac.
Persica	Persian Lilac.
Tamarix gallica	Tamarix.
Tilia Americana	Basswood Linden.
Tilia Europæa aurea	Golden Linden.
laciniata	Split-leaved Linden.
vitifolia	Grape-leaved Linden.
Ulmus Americana	White Elm.
rubra	Slippery Elm.
purpurea	Purple elm.
Montana var	Huntingdon Elm.
Viburnum prunifolium	"Black Haw."
Opulus	High Bush Cranberry.
Opulus, var. sterilis	Snow-ball.

Vinca major	Periwinkle.
Vitis indivisa	Wild White Grape.
Virgilia lutea	Yellow-wood.
Weigelia hortensis	Common Weigelia.
Japonica	Japan Weigelia.
arborea grandiflora	Largeflowered Weigelia.
Wisteria frutescens	Common Wisteria.

LIST OF APPLES.

In this and following lists, where I have not been able to verify the name of the fruit, I have added the name of the party from whom received, as my authority.

Allen Crab.
American Golden Russet.
American Summer Pearmain.
Antonovka.
"Aport Orient" (Budd).
Austin Sweet.
Autumn Seeknofurther.
Baker.
Baldwin.
Bailey's Sweet.
Bellflower Pippin.
Bentley's Sweet.
Belmont.
Ben Davis.
Benoni.
Black Warrior.
Black Twig.
Blinkbonny.
Blooming Orange.
Bowers's Nonpareil.
Brabant Bellflower.
Bushwhacker.
Baboushkino.
Batullen-apfel.
Baumann's Reinette.
Boiken-apfel.
Belle de Boskoop.
Buckingham.
Canada Red.
Carolina Red June.
Caroline.
Celestia.
Clyde Beauty.
Cole's Quince.
Cole.
Cogswell.
Cornell's Fancy.
Coral Crab.
Cheese.
Chenango Strawberry.
Cherry Crab.
Charlack Reinette.
Clermont.
Danvers Winter Sweet.
Dartmouth Crab.
Disharoon.
Dominie.
Duchess of Oldenburgh.
Dyer.
Early Red Margaret.
Early Queening.
Early Ripe.
"Early Baking" (Stayman.)
Early Harvest.
"English Pippin" (No. 161, Budd).
English Sweet.
Egyptian Queen.
Esten.
Eureka.
Fallawater.
Fall Harvey.
Fall Wine.
Fall Greening.
Fall Pippin.
Fall Stripe, or Saxton.
Fall Spitzenburgh.
Fameuse.
Fay's Russet.
Fanny.
Fink.
Franklin's Golden Pippin.
Fulton Strawberry.
Gideon's No. 7 Crab (Stayman).
Gideon's No. 8 Crab (Stayman).
Golden Beauty Crab.
Garretson's Early.
Geneva Pippin.
Gilpin.
Golden Sweet.
Gravenstein.
"Gramar's Pearmain."
Grosh.
Grimes's Golden.
"Gelber Stetteiner" (Budd).
"Grüner Fürsten-apfel" (Budd).
Hawthornden.
Henwood.
Hightop Sweet.
Holland Pippin.
Hopkins.
Hughes's Crab.
Homestead Crab.
Hyslop Crab.
"Howsley's Winesap" (Stayman).

Hubbard.
Huntsman's Favorite.
"Herren-apfel" (Budd).
Indiana Favorite.
Jefferis.
Jonathan.
Julian.
Kansas Queen.
Keswick Codlin.
Kinkead.
Kirkbridge White.
Krauser.
Lady Apple.
"Lady Washington of Ohio" (Stayman).
"Ladies' Choice" (Stayman).
Lawver.
Late Strawberry.
Large Yellow Bough.
Lady's Sweet.
Ledge Sweet.
Lankford.
Lever.
Limbertwig.
Long Red Pearmain.
Lake Winter Crab.
Lowell.
Landsberger Reinette.
"Lead Apple" (Budd).
"Late Grüner" (Budd).
Malus Maxima Crab.
Maiden's Blush.
Mann.
Mattamusket.
Mangum.
"Mason's Orange" (Stayman).
Maiden's Favorite.
Martha Crab.
Mary Womack.
McAfee's Nonsuch.
McIntosh's Red.
McLellan.
Mellinger.
Missouri Pippin.
"Muscat Livlandisher" (Budd).
"Nero" (Stayman).
Newark Pippin.
"Neumeister" (Budd).
Nickajack.
Northern Spy.
Northern Sweet.
Oblong Crab.
Ohio Nonpareil.
Ohio Pippin.
Ortley.
Oskaloosa.
Perry Russet.
Pennock.
Pewaukee.
Primate.
Parkinson's Blue (Stayman).
"Polnischer Jungfern-apfel" (Budd).
"Possart's Nalivia-apfel" (Budd).
"Queen's Choice" Crab (Stayman).
Rawle's Genet.
Rambo.
Red Seeknofarther.
Red Cedar.
Red Crab.
Red Winter Pearmain.
Red Astrachan.
Richmond.
Roman Stem.
Rome Beauty.
"Reinette Ruski" (Budd).
"Rambour" (Budd).
"Rambour Grüner" (Budd).
"Renischer Bohn-apfel" (Budd).
Soulard Crab.
Scollop Gilliflower.
Sciota Beauty.
Showy Crab.
Stuart's Golden.
Shockley.
Sops of Wine.
Smith's Cider.
Smokehouse.
Striped Winter Pearmain.
Summer Rose.
Swaar.
"Sweet Gilliflower" (Stayman).
"Stayman's McAfee" (Stayman).
"Stayman's No. 2" (Stayman).
"Stayman's No. 9" (Stayman).
Shiawassee Beauty.
Talman's Sweet.
Tetofsky.
Trenton Early.
Tuttle.
Twenty-ounce.
"Titovka" (Budd).
Vandervere Pippin.
Victuals and Drink.
"Vermillion."
Wine.
Winthrop Greening.
Wagener.
Warfield.
Washington Strawberry.
Whitney's No. 20, Crab.
Western Beauty.
Woodbridge.
Winesap.
Willowtwig.
White Winter Pearmain.
Wolf River.
"Winiovka" (Budd).
Yellow Siberian Crab.
Yellow Bellflower.
Yellow Newtown Pippin.
Yopp's Favorite.
Nos. 161, 413, 316 of Budd's list.

LIST OF PEARS.

STANDARD TREES.

"Achter Streifling" (Budd).
André Desportes.
Bartlett.
Belle Lucrative.
"Bessemianka" (Budd).
Beurré d'Anjou.
Beurré Clairgeau.
Beurré Hardy.
Beurré Superfin.
Beurré Bosc.
Beurré Giffard.
Clapp's Favorite.
"Cockins's Hybrid" (Griesa).
Columbia.
Duchesse Precoce.
"Duchess Hybrid" (Griesa).
"Dulcis Polisti" (Budd).
Doyenné Boussock.
Doyenné du Comice.
Doyenné d'Alencon.
Dr. Reeder.
Flemish Beauty.
Frederick Clapp.
"Father's Keepsake" (Budd).
"Garber's Hybrid" (Griesa).
Howell.
Hoosic.
Jones.
Keiffer.
Josephine de Malines.
"Jungfern-Birn" (Budd).
"Livlandisher" (Budd).
LeConte.
Madame Treyve.
Mount Vernon.
"Mediodovka" (Budd).
Osband's Summer.
Paradise d'Automne.
Paul Ambre.
Petite Marguerite.
"Pomeranen-Birn" (Budd).
"Pfund-Birn" (Budd).
Pitmaston Duchess.
Seckel.
Sheldon.
Souvenir du Congres.
Souvenir d' Esperan.
"Sha-li" (Griesa).
"Suet-li" (Griesa).
"Smith's Hybrid" (Griesa).
Tyson.
Urbaniste.
Winter Nelis.
"Wein-Birn" (Budd).

DWARF TREES.

Beurré Giffard.
Beurré Superfin.
Belle Lucrative.
Bonne du Puits Ansault.
Brockworth Park.
Columbia.
Conseiller de la Cour.
Dr. Reeder.
Duhamel de Monceau.
Frederick Clapp.
Gansel's Bergamot.
Gansel's Seckel.
Howell.
Josephine de Malines.
Keiffer.
Pitmaston Duchesse.
Petite Marguerite.
Sheldon.
Tyson.
Winter Nelis.

The following pears have Prof. Budd's numbers only:

"13 Orel," "102 Voronesh," "103," "125," "358," "392," "439," "513," "520."

LIST OF APRICOTS.

Early Golden.
Large Early Montgamet.
Peach.
Royal.
St. Ambroise.
Large Early.
Alberge de Montgamet.
Russian.
Moorpark.

LIST OF PEACHES.

Ashby's Early.
Amsden.
Brandywine.
Black's Columbia.
Bilyeu's Late.
Brice.
Briggs's Red May.
Crawford's Early.
Crawford's Late.
Carter's Late Red.
Chinese Cling.
Crothers.
Emporia.
Early Rivers.
Early Louise.
Early Tillotson.
Flener.
Foster.
George IV.
Governor Garland.
Hale's Early.
Haines's Surprise.
Heath Cling.
Lemon Cling.

Morris White.
Mountain Rose.
Newington Free.
Old Mixon Free.
Poplar.
Prince of Wales.
President.
Silver Medal.
Stump the World.
Smock Free.
Susquehanna.
Salway.
Wilder.
Wilkins Cling.

LIST OF CHERRIES.

English Morello.
Early Richmond.
May Duke.
Governor Wood.
Large Montmorency.
Olivet.
Common Morello.

LIST OF PLUMS.

Coe's Golden Drop.
Wild Goose.
Miner.
Lombard.
Blue Mont.
Moreman.
Myrobolan.
Sand Plum.
Red and Yellow.
And two select native varieties unnamed.

LIST OF GRAPES.

Agawam.
Amber.
Beauty.
Brighton.
Black Eagle.
Catawba.
Creveling.
Cottage.
Concord.
Clinton.
Cynthiana.
Diana.
Delaware.
Duchess.
Dracut Amber.
Elvira.
Essex.
Goethe.
Grein's Golden.
Herbemont.
Hartford.
Isabella.
Iona.
Ives.
Lindley.
Lady.
Martha.
Missouri Riessling.
Moore's Early.
North Carolina.
Pocklington.
Perkins.
Pearl.
Rulander.
Salem.
Telegraph.
Taylor.
Uhland.
Wilder.

LIST OF BLACKBERRIES.

Agawam.
Ancient Briton.
Brunton's Early.
Dorchester.
Early Harvest.
Early Cluster.
Kittatinny.
Knox.
Lawton.
Newman's Thornless.
Needham's White.
Snyder.
Stone's Hardy.
Western Triumph.
Wachusett.
Wilson Jr.
Wilson's Early.

LIST OF RASPBERRIES.

Brinkle's Orange.
Brandywine.
Belle de Fontenay.
Crimson Beauty.
Caroline.
Cuthbert.
Franconia.
Fastolff.
Gregg.
Highland Hardy.
Herstine.
Hansel.
Hopkins.
Hornet.
Imperial.
McCormick.
Ohio.
Parnell.
Philadelphia.
Souhegan.
Thwack.
Turner.
Yellow Antwerp.

LIST OF CURRANTS.

Black Naples.
Cherry.
Fay's Prolific.
Lee's Black Prolific.
Prince Albert.
Victoria.
White Grape.

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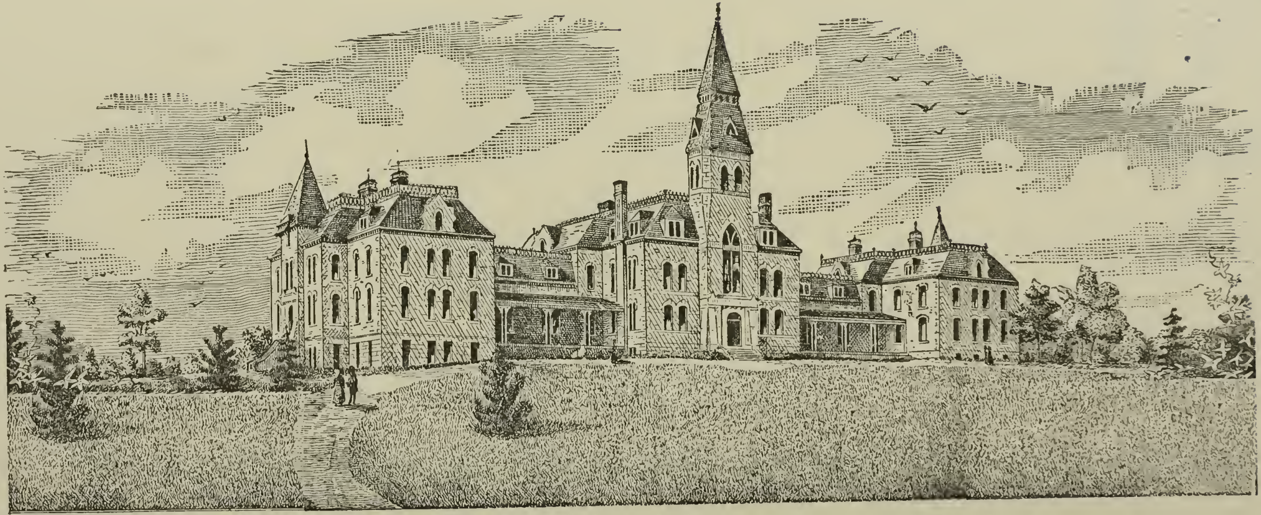

STATE AGRICULTURAL COLLEGE, MANHATTAN, KANSAS.

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FIFTH BIENNIAL REPORT

OF THE

REGENTS AND FACULTY.

1885-6.

WITH APPENDICES.

TOPEKA, KANSAS:
KANSAS PUBLISHING HOUSE: T. D. THACHER, STATE PRINTER.
1886.

BOARD OF REGENTS.

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KANSAS STATE AGRICULTURAL COLLEGE,
MANHATTAN, KAS., Dec. 15, 1886.

To His Excellency Governor JNO. A. MARTIN:

DEAR SIR—I transmit herewith, under the laws of the State, the fifth biennial report of the Board of Regents of the Kansas State Agricultural College, including the annual reports of the President, professors and other officers, for the years ending June 30, 1885, and June 30, 1886.

Respectfully yours,

GEO. T. FAIRCHILD,
Secretary Board of Regents.

KANSAS STATE AGRICULTURAL COLLEGE.

REGENTS' REPORT.

To His Excellency John A. Martin, Governor of the State of Kansas—SIR: The Regents of the State Agricultural College respectfully submit this the Fifth Biennial Report for the two years ending June 30, 1886, and append reports of officers of all departments, showing the work, growth and present condition of the College.

The two years have shown a continuance of the prosperity noted in the last report. The College hall has been completed, improvements in other buildings have been undertaken, and the general development of the farm and grounds has been noticeable. The grounds have been platted by a professional landscape gardener, Mr. Max. Kern, of St. Louis, and extensive plantations for ornamental and illustrative purposes are begun. The increase of farm lands, authorized by act of Legislature, approved March 5, 1885, was effected in September, 1885, by the purchase of 44 acres contiguous to the north side of the College site, at $110 per acre. This lot, with 16 acres secured some years previously at $40 per acre, makes, at a cost of $5,480, an addition of 60 acres to the original site of 155 acres, and gives the College in its two farms a total of 315 acres.

The total property of the College has in the two years increased from $145,857.95 to $207,678.03, as shown in the report of the Secretary appended. The annual attendance has increased from 395 to 428, representing sixty counties of this State, and eighteen other States, with larger classes in the advanced years of the course. The graduates of the last two years number thirty-five, against twenty-nine in the two previous years.

The course of study remains essentially the same, varied only by incidental improvement of methods and apparatus in the general growth of the institution.

The requirements of industrial training have been slightly increased by the addition of a term of sewing for the young women. The Domestic Department has, in enlarged quarters and with an additional instructor, shown most marked improvement in its hold upon the young women attending.

Each student is expected to take three studies, besides one hour's practice in an industrial art; and variation from this rule can be made only with the consent of the Faculty.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following gives the general scope of the two; but further explanations are found in the annual catalogue:

FIRST YEAR — FALL TERM.

Arithmetic.
English Analysis.
Geometrical Drawing.
Industrial.

WINTER TERM.

Book-keeping.
English Structure.
United States History.
Free-hand Drawing three hours a week.
Industrial.

SPRING TERM.

Algebra.
English Composition.
Botany.
Industrial. (Carpentry or Sewing.)

SECOND YEAR — FALL TERM.

Algebra completed.
Elementary Chemistry.
Horticulture.
Fourteen lectures in Military Science.
Industrial.

WINTER TERM.

Geometry.
Agriculture or Household Economy.
Organic Chemistry and Mineralogy.
Twelve lessons in Military Science.
Industrial. (Cooking.)

SPRING TERM.

Geometry completed. Mechanical Drawing.
Entomology.
Analytical Chemistry.
Industrial. (Farm and Garden or Dairy.)

THIRD YEAR — FALL TERM.

Trigonometry and Surveying.
Anatomy and Physiology.
General History.
Industrial. (Farm and Garden).

WINTER TERM.

Mechanics.
Agricultural Chemistry.
Rhetoric.
Industrial.

SPRING TERM.

Civil Engineering or Hygiene.
Physics.
English Literature.
Mechanical Drawing two hours a week.
Industrial.

FOURTH YEAR — FALL TERM.

Agriculture or Literature.
Physics and Meteorology.
Psychology.
Industrial.

WINTER TERM.

Logic, Deductive and Inductive.
Zoölogy.
Structural Botany.
Industrial.

SPRING TERM.

Geology.
United States Constitution.
Political Economy.
Industrial.

In addition to the required industrial training in carpentry, farming, horticulture, sewing, cooking and dairying, opportunity is given for learning various kind of wood and iron work, printing, telegraphy, dress-making, instrumental music, and type-writing. Special courses in the sciences are provided for students sufficiently advanced to pursue them, and military drill may be taken under an officer of the regular army.

The degree of Bachelor of Science is conferred upon students who complete the full course of four years and sustain all the examinations.

The degree of Master of Science is conferred in course upon graduates who comply with the following conditions:

1. Each candidate shall furnish evidence satisfactory to the Faculty of proficiency in at least one of each of the groups of arts and sciences here named:

Arts:
Agriculture.
Horticulture.
Engineering.
Architecture and Designing.
Domestic Economy.

Sciences:
Botany.
Chemistry.
Zoölogy.
Entomology.
Physics.

2. Each candidate shall present for consideration by the Faculty a satisfactory thesis, involving original researches in line with one or the other of the courses pursued as above, and shall deposit a perfect copy in the College library.

3. Application to the Faculty for sanction of the lines of study and research selected should be made as early as the first day of November, and the subject of the thesis must be settled upon as soon as the first day of January preceding the Commencement at which the degree is expected.

4. Candidates must be from graduates of three or more years' standing, unless a post-graduate course of one year or more has been pursued at this College, in which case the second degree may be conferred two years after graduation.

Outlines of direction for study and research in various arts and sciences, with special adaptation to the wants and opportunities of individual applicants, will be furnished, at request, to all graduates; and Professors in charge will gladly aid by correspondence in any researches undertaken.

The corps of instructors has had a few changes. William H. Cowles, Instructor in English and History, was made full Professor in that chair at the close of the College year, 1884–85; but at his own request was granted leave of absence for a three-years course of professional study at Harvard, and is not likely to return. Prof. O. E. Olin was installed in his place. Prof. J. D. Walters, for seven years Instructor in Drawing, has been made Professor of Industrial Art and Designing. Prof. B. F. Nihart was appointed Librarian in place of Professor of Mechanics and Engineering, in 1885, and in 1886 retired from the Faculty. The chair of Physics and Engineering was created in June, 1885, and Mr. E. B. Cowgill was appointed to fill it. Superintendent T. T. Hawkes, for seven years in charge of the Mechanical Department, retires at the close of this year for rest, and Mr. O. P. Hood, a graduate of Rose Polytechnic school, is appointed to the place. Prof. W. L. Hofer, for eight years in charge of Instrumental Music, retires on account of insufficient health for the increased duties, and Prof. A. B. Brown, A. M., is called to the place.

OFFICERS OF THE COLLEGE.

The Faculty of Instruction and subordinate officers are as follows, the salaries to be paid for the coming year being affixed to the names:

Geo. T. Fairchild, A. M., President, Professor of Logic and Political Economy	*$2,500
Edward M. Shelton, M. Sc., Professor of Agriculture and Superintendent of Farm	*1,800
Geo. H. Failyer, M. Sc., Professor of Chemistry and Mineralogy	1,600
Edwin A. Popenoe, A. M., Professor of Horticulture and Entomology, Superintendent of Orchards and Gardens	1,600
William A. Kellerman, Ph. D., Professor of Botany and Zoölogy	1,600
David E. Lantz, M. Sc., Professor of Mathematics	1,400
William J. Nicholson, Lieut. 7th U. S. Cavalry, Professor of Military Science and Tactics	†
John D. Walters, M. Sc., Professor of Industrial Art and Designing	1,400
Ira D. Graham, B. Sc., Secretary, Superintendent of Telegraphy	1,400
Elias B. Cowgill, A. M., Professor of Mechanics, Physics and Engineering	1,400
Oscar E. Olin, Professor of English and History	1,400
George F. Thompson, Superintendent of Printing	900
Mrs. Nellie S. Kedzie, M. Sc., Teacher of Household Economy and Hygiene	1,000
Mrs. Elida E. Winchip, Superintendent of Sewing	800
Ozni P. Hood, B. Sc., Superintendent of the Workshops	1,000
Alexander B. Brown, A. M. Professor of Music	‡500
Julius T. Willard, M. Sc., Assistant in Chemistry	800
W. Whitney, Foreman of the Farm	*600
George E. Hopper, B. Sc., Foreman of the Gardens	720
William Baxter, Foreman of the Greenhouse	720
Jacob Lund, M. Sc., Foreman of the Blacksmith Shop	600
Ernest Winne, Janitor	§600

* With house rent free. † Detailed without extra pay. ‡ With fees from instrumental lessons. § With house rent, fuel and lights free.

APPROPRIATIONS.

The completion of the main building, for which appropriation was made in 1883, was reached in November, 1884. The total cost of the building, including steam heat, was as follows:

FROM APPROPRIATION.	
Stone work, Jacob Winne	$6,241 56
Carpentry, plastering, painting, etc., J. O. Nichols	10,863 88
Steam heating, McCarthy & Sheahan	2,385 00
Plans and specifications, E. T. Carr	250 00
Supervision, T. T. Hawkes	100 00
Advertising, sundry papers	66 45
Lumber, Mississippi Lumber Company	47 22
Extras, J. H. Lynch	45 89
Total	$20,000 00
FROM GENERAL FUNDS.	
Carpentry, J. O. Nichols	$398 50
Masonry, J. Winne	531 31
Supervision, T. T. Hawkes	100 00
Painting, C. D. Marvin	29 60
Steam heating, McCarthy and Sheahan	257 40
Total	$1,316 81

This amount is in excess of the appropriation by $1,316.81. This Board has never before reported a deficiency in building appropriations, and only the exigency of completing a building universally considered the best for its cost in the State, while the wants, of increasing numbers, were urging immediate action, impelled to such expenditure. This report should have been made to the Legislature of 1885, had the settlement been completed soon enough. The furnishing was considered within the province of the Board in use of College funds.

The appropriation of $4,000 for a "President's house complete" was expended for a very convenient stone dwelling of ten rooms, heated by furnace and well finished. The following items make the total expenditure:

Masonry, J. Winne	$1,405 50
Carpentry, plastering, painting, etc., Hulse & Moses	2,338 77
Furnace and pipes, A. J. Whitford	240 45
Freight on sundries, J. T. Ellicott	15 28
Total	$4,000 00

The appropriation of $1,500 for steam-heating apparatus in the chemical laboratory was wholly used as contemplated, in providing steam heat for the building and the various heating apparatus required in connection with the uses of the building, including drying closets and evaporating hoods. The items are as follows:

Heating coils, McCarthy & Sheahan	$885 00
Labor, J. Lund	50 00
Masonry, J. Winne	26 75
Steam closets, etc., Eimer & Amend	286 10
Pipe and fittings, E. D. Hornbrook & Co	51 00
Plumbing, P. W. Zeigler	17 10
Hardware, A. J. Whitford	3 75
Hardware, J. S. Corbett	2 30
Brick work, R. Ulrich	18 50
Plastering, F. Samuels	6 00
Painting, T. Law	8 00
Labor and lumber, Mechanical Department	80 50
Labor in fitting, Executive Department	44 31
Freight, J. T. Ellicott	19 81
Total	$1,500 00

The appropriation for experimental barn of $4,500 has been used in admirable fashion, to the effect of giving a most complete and convenient arrangement, both for general purposes and for experiment. A full description is given in an appendix to this report. The items of expense are as follows:

Stone work, J. Winne	$1,650 54
Carpentry, etc., Hulse & Moses	2,008 93
Flagging, Harding Bros	127 09
Carpentry, H. Ferris	41 35
Pipe and fitting, Executive Department	74 72
Labor and lumber, Mechanical Department	36 90
Labor, Farm Department	107 50
Shafting, belts, etc., Morse Engine Co	99 60
Machinery, D. F. Barclay	22 00
Machinery, Belle City Manufacturing Co	42 25
Machinery, Borden, Sellick & Co	57 50
Machinery, J. Sedgebeer	6 80
Machinery, S. Freeman	12 00
Machinery, Koppenhaver	17 50
Tank, Ulrich Bros	18 00
Furniture, W. H. Bower	7 00
Furniture, S. M. Fox	3 60
Furniture, E. K. Shaw	7 50
Tram car, Wishert & Knapp	20 00
Hardware, A. J. Whitford	31 08
Hardware, P. W. Zeigler	3 17
Hardware, E. B. Purcell	6 30
Lumber, E. B. Purcell Elevator Co	28 60
Lumber, Chicago Lumber Co	95
Labor, William Condray	20 00
Pipe and fittings, E. D. Hornbrook	7 65
Pipe and fittings, Kimble Pump Co	4 10
Express, E. M. Shelton	95
Freight, J. T. Ellicott and Jno. E. Hessin, Treasurers	36 42
Total	$4,500 00

The appropriations of $3,000 for finishing a building for museum and laboratory purposes became available July 1st, 1886. A contract for the essentials of the building has already been awarded, and the whole will be completed early in autumn. The appropriation for cattle shed and corn crib, $1,100, is also available this summer, and contracts for those will be completed by November 1st.

The appropriation for general repairs of $500 in the year ending June 30th, 1885, and $700 in the year ending June 30th, 1886, have been expended according to law in current repairs or needed improvements as itemized below:

GENERAL REPAIRS, 1884-5.		
Adam Steinbach, plastering	$87 55	
Samuel Hoyt, painting	95 91	
Thomas Dyer, plastering	35 00	
C. D. Marvin, painting	69 05	
J. Winne, masonry	99 21	
Steele & McKelvey, slating	12 00	
Ball & Dyer, plastering	101 28	
		$500 00
GENERAL REPAIRS, 1885-6.		
E. T. Barnum Wire and Iron Company, cresting	$68 70	
F. Samuels, plastering	12 00	
T. Law & Co., painting	364 28	
J. Winne, masonry	22 68	
A. J. Whitford, tinning	96 90	
J. Bromich, boiler mending	12 62	
R. O. Thomen, cresting	6 15	
J. T. Ellicott, freight	45	
Phœnix Wire and Iron Works, cresting	2 75	
Hulse & Moses, carpentry	32 25	
George T. Fairchild, hardware, glass and trimmings	18 40	
A. Baker, weather strips	14 00	
C. A. Gundaker, brick-laying	7 50	
C. D. Marvin, painting	5 25	
E. B. Purcell, hardware	14 30	
Chicago Lumber Company, lumber	6 00	
Mechanical Department, labor	15 77	
Total		$700 00

The appropriation of $1,400 for the year ending June 30th, 1887, is not yet expended, though plans already contemplated will consume the most of it during the present summer. The Loan Commissioner has received the $300 appropriated for his salary, and the $4,613.44 refunded for expenses and losses in maintaining the endowment has been received and used for current expenses.

Further appropriations will be needed, chiefly for improvement of the buildings in use, and for storage cases for the increasing collections and apparatus of the different departments. These wants will be presented, however, in detail at the close of this report.

It is very desirable that provision be made at an early date for a residence upon the grounds for the Superintendent of Horticulture, to whose care important interests and risks are committed. The matter was postponed at the last session, but should not be lost sight of in the growing importance of this department.

THE ENDOWMENT.

The fund from sale of lands granted to the State in 1862 was, two years since, $474,305.18. It is now $499,303.98—all but 160 acres of the lands having been sold. The exact condition of this fund as at present invested is shown in the appended report of the Secretary of this Board. It is now very difficult to obtain satisfactory investments so as to keep the fund at interest in bonds, and some further legislation may yet be needed to provide for the future profitable management of so considerable a fund.

No decision has yet been made by the Department of the Interior upon the claim of the State for 7,686.47 acres refused to the State in the original selection, though the Land Commissioner has made a favorable report to the Secretary upon the case. It is to be hoped that the land may be granted before it is too late to secure the requisite number of acres of arable land within the State.

This fund has suffered a slight diminution from losses beyond the control of the Board, and must, under the following acts, be made good by the State:

The act of Congress approved July 2d, 1862, contains these provisions:

"SEC. 3. That all the expenses of management, superintendence and taxes from the date of selection of said lands, previous to their sales, and all the expenses incurred in the management and disbursement of the money which may be received therefrom, shall be paid by the State to which they belong, out of the treasury of said State."

And further:

"SEC. 5. *First:* If any portion of the fund to be invested as provided by the foregoing section, or *any portion of the interest thereon*, by any action or contingency be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund *remain forever undiminished* to the purpose mentioned in section four of this act.

"*Second:* No portion of said fund, *nor the interest thereon*, shall be applied, under any pretense, whatever, to the purchase, erection, preservation or repair of any building or buildings."

By joint resolution of the Legislature, approved February 3, 1863, these conditions and provisions were accepted, stating in express terms: "The State hereby agrees and obliges itself to comply with all the provisions of said act." In fulfillment of our part of this contract, it becomes our duty to present for the proper consideration of the Legislature a statement of such expenses and losses as yet unpaid by the State.

The report of 1884 referred to probable losses in settlement with districts now in Stafford county, but allowed to incur indebtedness as designated districts of Barton county.

Those districts were found by Regent C. A. Leland, sent to investigate the condition in 1884, so wholly incompetent, on account of division and diminution of territory, that acting upon his advice, the Board consented to a compromise of judgment already rendered, by issuing new bonds in lieu of the old ones — in one instance by less than the original debt by $264.34. This agreement was entered into upon the express conviction that to enforce the judgment would bring a serious hardship to parties not responsible for the existing state of affairs. It also involved a loss of interest upon the delinquent bonds, amounting to $960, estimating only simple interest for six years of delinquency.

A peculiar case of forgery of a district bond for $800 has come to light within the past year. The bond of District 77, Linn county, for $800, due in June, 1885, was negotiated in January, 1878, by R. B. Bryan, County Superintendent. The interest was promptly met through the same official up to the time when all funds were turned over to the State treasury, in March, 1883. In June, 1883, the interest was again paid, with a plausible explanation of the fact that it did not come through the ordinary channel. When the district appeared delinquent, an inquiry led to the discovery that District 77 had never issued a bond, and no register of such a bond exists in the office of the county clerk, though the certificate of registration is in due form, signed and sealed. After full investigation, the Board is satisfied that R. B. Bryan, while County Superintendent, forged the bond and accompanying papers, and has filed a complaint against him with the County Attorney of Linn county. There seems to be no chance of recovering the loss, since the guilty person is shown to be without property and out of the State. This loss of $800 from the endowment fund and $240 from interest must be made good as required by the laws above quoted.

Other investments are in good condition, but few districts showing delinquency, and those chiefly such as have as yet had no opportunity to make levy for interest. The rates of interest, however, are annually diminishing, the average rate on the 30th of June, 1886, being not quite seven per cent. The annual income must now be less than $35,000. The surplus reported two years ago has disappeared in the land purchase before mentioned, and other reported improvements; and the College is now troubled to meet the ordinary bills for the months of October, November, March, and April, for want of a working surplus to tide over the months when little interest is received. The restoration of losses and extra expenditures referred to above, will furnish much-needed funds for the immediate wants of the growing institution; but the future growth will surely bring demands which the State should meet with its usual foresight.

IMMEDIATE WANTS.

The College is now in need of apparatus in several departments beyond its present means, and the cases required for its growing collections in Zoölogy, Entomology, Geology, and Mineralogy, as well as for physical apparatus. For some of these, no provision has been made as yet, and others are very imperfectly protected in the imperfect cases moved from the original buildings of twenty years ago.

The repairs of the next two years will be slightly larger than in the past, from the increased extent and age of the buildings. An enlargement of the chapel is an immediate necessity for the rapid growth of the school, and certain repairs upon the body of the room should be made at the same time, for the sake of economy. It now seats 405 in the body of the house, and could be enlarged to a capacity of 575 by an extension in the rear for the rostrum. The College needs also, for the sake of economy, a place for storing coal in quantities, being now dependent upon the current supply of a car-load at a time. Permanent inside blinds are also needed at windows of the main building now shaded only by curtains. The attic of the main central structure of the College building has never been finished. The space is now needed for over-flow classes and special students in drafting. It could be nicely completed, including steam heat, at a cost not to exceed $1,000, and add three good-sized class rooms to our present facilities.

A stated provision for the growth of the library is essential. Such provision the College is unable now to make from its current income. The Board therefore ask for an appropriation of $1,000 a year to be expended wholly for books. This age of rapid progress in science makes such provision essential to keeping abreast with the times in scientific accuracy.

There is also needed a provision for continuing and extending the experiments in agriculture. A bill now before Congress contemplating the establishment of an experiment station with each agricultural college, will, if passed, provide for such work in future years; but in order to make the best use of such provision, the College needs to be in readiness by keeping up the lines of experiment begun. For this a fund of $500 a year will barely suffice.

The expenses of the Loan Commissioner and Regents in the management of the funds, and a slight commission to the Land Agent, are to be provided for as usual—the items being furnished by the Auditor of State for the miscellaneous appropriation bill. In this connection the Board call attention to the scant provision during the last two years for mileage and per diem of Regents. A slight deficiency appears, to be met at this session. Sundry items of expense in care of funds are to be reported as required by law. The total extra expenses in care of lands and funds have been as follows:

Inspection of real estate	$9 00
Clearing tax title, Dickinson county	214 78
Postage, etc., Loan Commissioner, two years	23 86
Total	$247 64

The tax title, above mentioned, had been gained by no neglect of the College authorities so far as appears, in that the forfeiture of contract occurred after the levy for which sale was made had been perfected. The oversight, if any, was in the failure to discover the claim until years had added interest to the original amount.

The following summary expresses in dollars and cents the several immediate wants of the College:

CASES FOR COLLECTIONS, ETC.		
General museum	$2,000 00	
Mineralogical cabinet	650 00	
Physical apparatus	500 00	
Entomological cabinet	350 00	
		$3,500 00
APPARATUS AND EXPERIMENTS.		
Farm, $500 a year	$1,000 00	
Mechanical	1,000 00	
Physical	1,000 00	
Chemical	500 00	
Zoölogical	200 00	
		3,700 00
Library, $1,000 a year		2,000 00
BUILDING IMPROVEMENTS.		
Chapel enlargement, seating and repairs	$3,500 00	
Inside blinds for College Hall, 130 windows	1,300 00	
Finishing attic of College Hall	1,000 00	
Coal cellar and scales	700 00	
		6,500 00
General repairs, $1,000 a year		2,000 00
REFUNDING LOSSES AND EXPENSES.		
Stafford county bonds, principal	$264 34	
Linn county forgery, principal	800 00	
		1,064 34
Stafford county, interest	960 00	
Linn county, interest	240 00	
		1,200 00
Expense in completion of building		1,316 81
Sundry expenses in care of funds and lands		247 64
Total for two years		$21,528 79

In closing this report, the Board would express their gratification at the interest shown throughout the State in the growth and prosperity of the institution, as shown in the press of the State, in the general attendance upon its exercises, and the general expression of satisfaction from visitors. The College has received many congratulations for the exhibition of students' work from its industrial and scientific departments at the recent meeting of the National Educational Association in Topeka. Visitors from other States have expressed their admiration of the work — so far advanced for the age of the State. It is hoped that ample provision for future growth and maintenance may not be lacking, as the income from the endowment is gradually diminished.

Respectfully submitted.

THOS. HENSHALL.
A. P. FORSYTH.
JNO. E. HESSIN.
T. P. MOORE.
A. B. LEMMON.
J. H. FULLINWIDER.
GEO. T. FAIRCHILD.

MANHATTAN, October 7, 1886.

REPORTS OF LAND AGENT.

To the Board of Regents—GENTLEMEN: I herewith submit my report as Land Agent for the fiscal year ending June 30, 1885.

LAND SOLD.

No.	*Purchaser.*	*Description.*	*Acres.*	*Price.*	*Cash.*	*Contracts.*	*Total.*
168	John T. Jenkins	W. ½ S. W. ¼, 22, 9, 5	80.00	$9 00	$90 00	$630 00	$720 00
169	Lewis D. Jones	E. ½ S. W ¼, 22, 9, 5	80.00	9 00	90 00	630 00	720 00
170	Kansas L. C. & E. Co.	S. E. ¼, 29, 15, 4	160.00	9 50	190 00	1,330 00	1,520 00
171	Kansas L. C. & E. Co.	S. E. ¼, 31, 15, 4	160.00	9 50	190 00	1,330 00	1,520 00
172	Thomas V. Lyon	S. E. ¼, 32, 9, 6	160.00	9 00	180 00	1,260 00	1.440 00
173	August Bulk	N. W. ¼, 9, 6, 6	160.00	9 00	180 00	1,260 00	1,440 00
174	Eugene K. Felt	N. W. ¼, 21, 5, 5	160.00	9 00	180 00	1,260 00	1,440 00
175	Eugene K. Felt	S. W. ¼, 21, 5, 5	160.00	9 50	190 00	1,330 00	1,520 00
176	Henry G. Rahe	S. W. ¼, 3, 6, 6	160.00	8 00	160 00	1,120 00	1,280 00
177	J. A. Thompson	S. E. ¼, 2, 6, 5	160.00	9 00	180 00	1,260 00	1,440 00
178	H. Wilkins	S. W. ¼, 5, 15, 4	160.00	12 50	600 00	1,400 00	2,000 00
179	Robert Willey	N. E. ¼, 2, 6, 5	153.02	9 00	172 35	1,206 45	1,378 80
180	T. W. Goff	S. W. ¼, 35, 5, 5	160.00	9 00	180 00	1,260 00	1,440 00
181	C. E. Gifford	N. E. ¼, 12, 10, 5	160.00	9 00	180 00	1,260 00	1,440 00
182	C. E. Gifford	S. E. ¼, 12, 10, 5	160.00	9 00	180 00	1,260 00	1,440 00
183	C. E. Gifford	E. ½ N. W. ¼, 12, 10, 5	80.00	9 00	90 00	630 00	720 00
184	Richard Waring	N. E. ¼, 19, 15, 4	160.00	10 50	210 00	1,470 00	1,680 00
	Totals		2,473.02		$3,242 35	$19,896 45	$23,138 80

RECAPITULATION.

Number of acres sold	$2,473 02
Amount sold for	23,138 80
Received in cash	3,242 35
Received in contracts	19,896,45
Average price per acre	9 32

DEPOSITED WITH STATE TREASURER.

Contracts, Nos. 168 to 184, inclusive	$19,896 45
Cash	3,242 35
Total	$23,138 80

LAND STATEMENT.

Unsold June 30, 1884, as per last report	$2,793 02
Sold as per report herewith submitted	2,473 02
Unsold June 30, 1885, N.E. ¼ 19, 15, 4, and N.W. ¼ 33, 15, 4	320 00

Respectfully submitted. JOHN B. GIFFORD, *Land Agent.*

MANHATTAN, KAS., July 1, 1885.

To the Board of Regents—GENTLEMEN: Herewith is submitted my report as Land Agent for the fiscal year ending June 30, 1886:

LAND SOLD.

No.	*Purchaser.*	*Description.*	*Acres.*	*Price.*	*Cash.*	*Contract.*	*Total.*
185	J. S. Phelps	N. W. ¼, 33, 15, 4	160	$12 00	$240 00	$1,680 00	$1,920 00

RECAPITULATION.

Number of acres sold	$160 00
Amount sold for	1,920 00
Received in cash	240 00
Received in contracts	1,680 00
Price per acre	12 00

DEPOSITED WITH STATE TREASURER.

Contract No. 185, amounting to	$1,680 00
Cash	240 00
Total	$1,920 00

LAND STATEMENT.

Unsold July 1, 1885, as per last report	320 acres.
Sold, as per report herewith	160 acres.
Unsold July 1, 1886, N.W. ¼ 33, 15, 4	160 acres.

Respectfully submitted. JOHN B. GIFFORD, *Land Agent.*

MANHATTAN, Kas., July 1, 1886.

REPORTS OF LOAN COMMISSIONER.

MANHATTAN, KANSAS, June 30, 1885.

To the Board of Regents of the Kansas State Agricultural College—GENTLEMEN: I herewith respectfully submit my report of investments made for the endowment fund of the Kansas State Agricultural College for the year ending June 30, 1885:

Invested in	six-per	cent.	school-district bonds	$33,774
"	seven	"	" "	1,750
"	six	"	county refunding bonds	3,000
"	ten	"	" " "	3,000
"	seven	"	city "	3,200
"	"	"	land contract	1,340
"	eight	"	note of Frank Purcell	400
Total				$46,464

Yours respectfully, J. T. ELLICOTT, *Loan Commissioner.*

MANHATTAN, KANSAS, August 31, 1885.

To the Board of Regents of the Kansas State Agricultural College—GENTLEMEN: I herewith submit my final report of investments made for the endowment fund of the Kansas State Agricultural College for the two months ending August 31, 1885:

Invested in	six per	cent.	school-district bonds	$12,110
"	seven	"	" "	1,150
Total				$13,260

Yours respectfully, J. T. ELLICOTT, *Loan Commissioner.*

HOLTON, KAS., July 23, 1886.

To the Board of Regents of the Kansas State Agricultural College—GENTLEMEN: I herewith respectfully submit my report of investments made for the endowment fund of the Kansas State Agricultural College, for the past ten months, ending June 30th, 1886:

Invested in school bonds, 6 per cent	$43,428 00
Invested in land contract, 8 per cent	850 00
Invested in township bonds, 6 per cent	2,600 00
Total	$46,878 00

Very respectfully, T. P. MOORE, *Loan Commissioner.*

TREASURERS' REPORTS.

To the Board of Regents—GENTLEMEN: Herewith find my report for the year ending June 30, 1885:

INTEREST ACCOUNT.

Balance on hand July 1, 1884	$3,951 07
Received from State Treasurer	38,700 00
" " Executive Department	2,258 59
" " Farm "	2,560 17
" " Horticultural "	1,094 07
" " Chemical "	108 10
" " Mechanical "	194 15
" " Printing "	672 60
" " Telegraph "	192 75
" " Domestic "	138 40
" " Sewing "	1 75
" " Library "	3 10
" " Military "	20
" " Loan "	8 85
" " State Auditor, refunding appropriation	4,613 44
" " Loan Commissioner, for note of Frank Purcell	400 00
" " Frank Purcell, interest on note	32 00
Total	$54,929 24
Paid approved vouchers, July 1, 1884, to July 1, 1885	49,878 86
Balance on hand July 1, 1885	$5,050 38

APPROPRIATIONS, 1884–85.

SOUTH WING, COLLEGE HALL.	
Received of State Auditor	$15,000 00
Paid approved vouchers	15,000 00
REFUNDING LOSSES AND EXPENSES.	
Received of State Auditor	$4,613 44
Transferred to interest account	4,613 44
GENERAL REPAIRS.	
Received of State Auditor	$500 00
Paid approved vouchers	500 00
FARM STOCK, FENCES, ETC.	
Received of State Auditor	$500 00
Paid approved vouchers	500 00
LIBRARY.	
Received of State Auditor	$500 00
Paid approved vouchers	500 00

Respectfully submitted. J. T. ELLICOTT, *Treasurer.*

MANHATTAN, KAS., July 1, 1885.

To the Board of Regents — Gentlemen: Herewith please find my final report as Treasurer, from July 1, 1885, to April 8, 1886:

INTEREST ACCOUNT.

Balance on hand July 1, 1885		$5,050 38
Received from July 1, 1885, to April 1, 1886:		
From E. A. Popenoe, Superintendent	$180 50	
" T. T. Hawkes, Superintendent	537 90	
" E. M. Shelton, Superintendent	481 49	
" G. T. Fairchild, President	335 55	
" I. D. Graham, Secretary	325 30	
" G. F. Thompson, Superintendent	66 35	
" Mrs. E. E. Winchip, Superintendent	7 25	
" B. F. Nihart, Librarian	7 41	
" Geo. H. Failyer, Superintendent	6 90	
" Mrs. N. S. Kedzie, Superintendent	81 60	
		2,030 25
" State Treasurer		32,170 00
" Note of Geo. Avery (farm account)		450 00
Total receipts		$39,700 63
Total amount of vouchers paid from July 1, 1885, to April 1, 1886		38,332 46
On hand April 1, 1886		$1,368 17
Paid Jno. E. Hessin, Treasurer, April 8, 1886		1,368 17

APPROPRIATIONS, 1885–1886.

Received and expended during nine months ending April 1, 1886, as follows:

PRESIDENT'S HOUSE.	
Received of State Auditor	$4,000 00
Paid approved vouchers	4,000 00
STEAM HEAT, CHEMICAL BUILDING.	
Received of State Auditor	$1,359 74
Paid approved vouchers	1,359 74
GENERAL REPAIRS.	
Received of State Auditor	$656 03
Paid approved vouchers	656 03
HORTICULTURAL OFFICE.	
Received of State Auditor	$600 00
Paid approved vouchers	600 00
LOAN COMMISSIONER.	
Received of State Auditor	$50 00
Paid approved vouchers	50 00
EXPERIMENTAL BARN.	
Received of State Auditor	$4,220 30
Paid approved vouchers	4,221 25
Due Treasurer April 1, 1886	$0 95
Received of J. E. Hessin, Treasurer, April 8, 1886	95

Respectfully submitted. J. T. Ellicott, *Treasurer.*

Manhattan, Kansas, April 8, 1886.

To the Board of Regents — Gentlemen: Please find below my report for the three months since my election to the office of Treasurer, and closing the financial year 1885–6:

INTEREST ACCOUNT.

Balance from J. T. Ellicott, former Treasurer		$1,368 17
Received from April 1, 1886, to June 30, 1886, inclusive, from—		
Executive Department	$1,113 97	
Farm Department	1,888 70	
Horticultural Department	139 00	
Chemical Department	177 65	
Mechanical Department	142 57	
Printing Department	200 05	
Telegraph Department	30 00	
Domestic Department	68 70	
		3,760 00
From State Treasurer		8,810 00
Total		$13,938 81
Total amount of vouchers paid, April 1, 1886, to June 30, 1886		14,324 97
Due Treasurer, July 1, 1886		$386 16
Unpaid notes from Farm Department		590 00

APPROPRIATIONS, 1885-86.

Received and expended during three months, from April 1, 1886, to June 30, 1886.

LABORATORY STEAM HEAT.		
Received of State Auditor		$140 26
Paid approved vouchers		140 26
EXPERIMENTAL BARN.		
Received of State Auditor		$278 75
Paid former Treasurer	$0 95	
Paid approved vouchers	277 80	
		278 75
GENERAL REPAIRS.		
Received of State Auditor		$43 97
Paid approved vouchers		43 97
SALARY, LOAN COMMISSIONER.		
Received of State Auditor		$150 00
Paid approved vouchers		150 00

Respectfully submitted. JOHN E. HESSIN, *Treasurer.*

MANHATTAN, KAS., July 1, 1886.

REPORT OF THE SECRETARY, 1884-86.

To the Board of Regents—GENTLEMEN: Herewith is presented, in the usual concise tabular form, the transcript of monthly balances, showing the condition of the endowment fund at the close of each month, the sources of income in each year, the summary of the annual inventory, and the expenditures and receipts of each College department, for the years ending June 30, 1885, and June 30, 1886.

SOURCES OF INCOME, 1884-85.

STATE TREASURY.		
Interest on school bonds, 10 per cent	....	$3,363 00
Interest on school bonds, 7 per cent	....	6,673 04
Interest on school bonds, 6 per cent	....	6,226 72
Interest on municipal bonds, 10 per cent	....	520 00
Interest on municipal bonds, 8 per cent	....	400 00
Interest on municipal bonds, 6 per cent	....	4,533 00
Interest on real estate securities, 8 per cent	....	420 59
Interest on land contracts, 10 per cent	....	10,551 66
Interest on delinquent interest	....	525 20
		$33,213 21
COLLEGE DEPARTMENTS.		
Rent of buildings	$208 50	
Special fees from students	502 25	
Sales of produce, stock, etc	4,422 24	
From appropriations	4,864 13	
From refunded sundries	2,281 05	$12,278 17
Total income		$45,491 38

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1885.

EXECUTIVE DEPARTMENT.		
Farm and grounds	$28,000 00	
College buildings	96,710 00	
Furniture, fixtures, etc	3,534 15	$128,244 15
FARM DEPARTMENT.		
Barns, sheds, etc	$5,219 83	
Furniture and fixtures	264 00	
Teams — horses and mules	440 00	
Cattle, 43 head	8,045 00	
Swine, 26 head	500 00	
Implements and harness	2,263 95	
Produce in barn	741 75	
Crops in ground	327 65	
Fish ponds	150 00	
Wells and cisterns	335 25	18,287 43
HORTICULTURAL DEPARTMENT.		
Furniture and apparatus	$944 31	
Tools, implements and team	853 05	
Stock in plantations	1,758 00	
Stock in greenhouse	4,035 00	7,590 36
CHEMICAL DEPARTMENT.		
Physical apparatus	$1,056 25	
Chemical apparatus	3,663 35	
Chemicals, etc	277 90	
Mineral collection	1,017 50	6,015 00
NATURAL HISTORY DEPARTMENT.		
Tools, etc	$229 90	
Museums	3,398 35	
Museum, Scientific Club	196 00	
Models, etc	83 00	3,907 25
ENGINEERING DEPARTMENT.		
Instruments, etc	$540 00	
Desk, maps, etc	60 00	600 00
MATHEMATICAL DEPARTMENT.		
Apparatus, charts, etc	....	16 25
PRINTING DEPARTMENT.		
Presses, type, cases, etc	$2,802 60	
Supplies	118 95	2,921 55
TELEGRAPH DEPARTMENT.		
Lines, batteries, etc	$845 65	
Supplies, books, etc	43 85	889 50

SUMMARY OF GENERAL COLLEGE INVENTORY—CONCLUDED.

MECHANICAL DEPARTMENT.		
Tools, carpenter shop	$1,367 60	
Tools, blacksmith shop	415 00	
Lumber and other stock	618 91	
Supplies, etc	76 50	
Miscellaneous	175 05	
		$2,653 06
DRAWING DEPARTMENT.		
Tables, models, patterns, tools, etc	....	698 49
DOMESTIC DEPARTMENT.		
Kitchen furniture	$305 35	
Dairy apparatus	81 40	
		386 75
SEWING DEPARTMENT.		
Machines	$154 00	
Furniture, etc	280 85	
		431 85
MUSICAL DEPARTMENT.		
Pianos, organs, etc	$955 25	
Furniture, etc	23 80	
		979 05
LIBRARY DEPARTMENT.		
Books, pamphlets, etc	$7,657 43	
Furniture	333 35	
Catalogue	766 14	
		8,756 92
MILITARY DEPARTMENT.		
Cases, tools, etc	$107 75	
Uniforms	471 85	
		579 60
Grand total	....	$182,957 21

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1884-85.

DEPARTMENTS.	EXPENDITURES.				RECEIPTS.			ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	Appropriations.	*Income fund.*	*Department transfers.*	*Inventory decrease.*	*Cash.*	*Department transfers.*	*Inventory increase.*		
Instruction		$19,687 01				$250 00		$19,437 01	
Executive	$500 00	9,528 46	$23,144 86		$2,258 59	485 14	$28,566 23	1,863 36	
Farm	500 00	5,331 91	244 90		2,560 17	109 52	1,899 25	1,507 87	
Horticultural		2,806 85	657 18		1,094 07	44 92	912 65	1,412 39	
Chemical		692 68	529 02		108 10	57 00	1,394 57		$337 97
Natural History		418 59	135 35				672 50		118 56
Mechanical		3,525 55	26 49		194 15	2,510 13	296 42	551 34	
Printing		3,305 54	95 20		672 60	585 85	1,141 90	1,000 39	
Telegraph		294 70	5 20	$5 17	192 75			112 32	
Domestic		270 07	116 42	204 85	138 40	353 00		99 94	
Sewing		109 60	487 55		1 75	8 00	431 85	155 55	
Library	500 00	965 54	149 65		3 10		1,710 65		98 56
Drawing		128 71	94 85			5 15	73 56	144 85	
Engineering		186 35	11 20				138 50	59 05	
Mathematical			2 00					2 00	
Music		36 48	5 40				5 25	36 63	
Military		514 70	6 10		20		471 95	48 65	
English History		3 75	14 00					17 75	
Loan		380 35			8 85			371 50	
Land		20 40						20 40	
Treasury		354 81	15		43,745 44		699 31		44,089 79
New building	15,000 00	1,316 81	84 33	5,000 00		21,401 14			
Totals	$16,500 00	$49,878 86	($25,809 85)	$5,210 02	$50,978 17	($25,809 85)	$38,414 59	$26,841 00	$44,644 88
State Treasury				5,486 79				5,486 79	
Grand totals				$77,075 67			$89,392 76	$32,327 79	$44,644 88
Balance				12,317 09				12,317 09	

ENDOWMENT FUND.

MONTHLY BALANCES, 1884–85.

MONTHS.	SCHOOL BONDS.			MUNICIPAL BONDS.				LAND CONTRACTS.	REAL-ESTATE SECURITIES.		CASH.	ENDOWMENT.		
	10 per cent.	*7 per cent.*	*6 per cent.*	*10 per cent.*	*8 per cent.*	*7 per cent.*	*6 per cent.*		*8 per cent.*	*7 per cent.*		*Total.*	*Productive.*	*Acres land.*
July	$36,048 00	$97,104 19	$89,603 52	$3,700 00	$5,000 00	....	$113,300 00	$113,368 34	$7,950 00	....	$8,231 13	$474,305 18	$466,074 05	2,793.02
August......	34,691 57	96,829 69	101,403 52	3,700 00	5,000 00	....	113,300 00	115,899 21	7,950 00	....	1,451 19	480,225 18	478,773 99	2,153.02
September,	34,691 57	96,729 69	104,372 52	3,700 00	5,000 00	....	113,300 00	113,353 48	7,674 00	....	5,803 92	484,625 18	478,821 26	1,673.02
October.....	34,091 57	96,729 69	108,882 52	3,700 00	5,000 00	$3,200 00	113,300 00	110,798 20	7,674 00	....	1,249 20	484,625 18	483,375 98	1,673.02
November,	34,091 57	96,729 69	110,782 52	3,700 00	5,000 00	3,200 00	113,300 00	112,572 20	7,650 00	....	2,319 20	489,345 18	487,025 98	1,193.02
December..	33,886 29	96,434 69	110,782 52	3,400 00	5,000 00	3,200 00	114,300 00	111,433 20	7,650 00	....	3,258 40	489,345 18	486,086 70	1,193.02
January....	33,869 07	97,004 68	114,592 52	3,400 00	5,000 00	3,200 00	114,300 00	116,573 65	7,650 00	....	174 07	495,763 98	495,589 92	480.00
February ..	33,869 07	97,004 68	114,980 00	3,400 00	5,000 00	3,200 00	116,300 00	115,756 65	7,650 00	....	1,396 42*	495,763 98	497,160 40	480.00
March.......	33,709 24	96,994 18	114,980 00	3,400 00	5,000 00	3,200 00	116,300 00	113,870 52	7,400 00	....	2,590 04	497,443 98	494,853 94	320.00
April.........	33,709 24	97,644 18	117,690 00	3,400 00	5,000 00	3,200 00	116,300 00	110,954 38	7,400 00	....	2,146 18	497,443 98	495,297 80	320.00
May..........	31,364 24	95,550 85	117,733 34	3,400 00	5,000 00	3,200 00	116,300 00	107,923 15	7,400 00	....	9,572 40	497,443 98	487,871 58	320.00
June..........	28,591 07	91,569 23	118,783 34	3,400 00	5,000 00	3,200 00	116,300 00	104,324 82	7,400 00	$1,340 00	17,535 52	497,443 98	479,908 46	320.00

*Overdrawn.

MONTHLY BALANCES, 1885–86.

MONTHS.	SCHOOL BONDS.			MUNICIPAL BONDS.				LAND CONTRACTS.	REAL-ESTATE SECURITIES.		CASH.	ENDOWMENT.		
	10 per cent.	*7 per cent.*	*6 per cent.*	*10 per cent.*	*8 per cent.*	*7 per cent.*	*6 per cent.*		*8 per cent.*	*7 per cent.*		*Total.*	*Productive.*	*Acres land.*
July	$27,741 07	$89,588 67	$122,859 57	$3,400 00	$5,000 00	$3,200 00	$116,300 00	$103,924 82	$7,400 00	$1,340 00	$16,689 85	$497,443 98	$480,754 13	320.00
August......	27,552 31	88,853 00	128,959 57	3,400 00	5,000 00	3,200 00	116,300 00	96,202 84	7,400 00	1,340 00	19,236 26	497,443 98	478,207 72	320.00
September,	27,552 31	88,728 00	133,699 57	3,400 00	5,000 00	3,200 00	121,300 00	95,287 84	7,400 00	1,340 00	10,536 26	497,443 98	486,907 72	320.00
October.....	27,552 31	88,663 00	141,389 57	3,400 00	5,000 00	3,200 00	121,300 00	91,320 09	7,400 00	1,340 00	6,879 01	497,443 98	490,564 97	320.00
November,	27,552 31	88,663 00	146,322 57	3,400 00	5,000 00	3,200 00	121,300 00	87,455 95	5,300 00	1,340 00	7,910 15	497,443 98	489,533 83	320.00
December..	27,144 18	87,697 29	148,442 57	3,400 00	5,000 00	3,200 00	121,300 00	88,503 95	5,300 00	1,340 00	8,035 99	499,363 98	491,327 99	160.00
January....	26,682 13	86,664 79	147,561 34	3,400 00	5,000 00	3,200 00	121,300 00	82,329 75	5,300 00	1,340 00	16,585 97	499,363 98	482.778 01	160.00
February ..	26,682 13	86,664 79	147,446 34	3,400 00	5,000 00	3,200 00	121,300 00	80,197 25	5,300 00	1,340 00	18,833 47	499,363 98	480,530 51	160.00
March.......	26,682 13	86,664 79	155,646 34	3,400 00	5,000 00	3,200 00	121,300 00	74,419 04	5,300 00	1,340 00	16,411 68	499,363 98	482,952 30	160.00
April.........	26,682 13	86,664 79	155,646 34	3,400 00	5,000 00	3,200 00	121,300 00	72,153 81	6,150 00	1,340 00	17,826 91	499,363 98	481,537 07	160.00
May..........	18,127 13	85,864 79	153,879 68	3,400 00	5,000 00	3,200 00	121,300 00	68,736 69	6,150 00	1,340 00	32,365 69	499,363 98	466,998 29	160.00
June..........	15,626 13	83,153 45	161,809 68	3,400 00	5,000 00	3,200 00	123,900 00	65,670 20	4,716 67	1,340 00	31,547 85	499,363 98	467,816 13	160.00

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1885-86.

DEPARTMENTS.	EXPENDITURES.				RECEIPTS.			ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	Appropriations.	*Income fund.*	*Department transfers.*	*Inventory decrease.*	*Cash.*	*Department. transfers.*	*Inventory increase.*		
Instruction		$21,771 68	$73 80			$275 00		$21,570 48	
Executive	$700 00	15,103 49	8,336 31		$1,449 52	90 74	$15,679 50	6,920 04	
Farm	4,500 00	3,970 42	63 62		3,410 19	129 68	4,241 32	752 85	
Horticultural		2,565 74	108 35		319 50	87 95	569 97	1,696 67	
Chemical	1,500 00	668 42	57 65	$367 15	184 55	2,187 85		220 82	
Natural History		170 97	59 40				343 05		$112 68
Mechanical		3,562 60	11 10	26 96	680 77	2,155 44		764 45	
Printing		1,816 10	21 05		408 40	567 17	308 08	553 50	
Telegraph		276 72	6 75		213 00	73 80	85 35		88 68
Domestic		203 06	71 03		150 30		34 40	89 39	
Library		1,407 56	60 00		7 41		1,642 11		91 96
Treasury		367 29		4,846 54	40,980 00				35,766 17
Land									
Loan	300 00	99 44						399 44	
Mathematical			5 50	8 00		8 00		5 50	
Drawing		202 80	22 37				132 53	92 64	
Mechanics and Physics		137 65	1,207 00			2 60	1,209 00	133 05	
Music		183 67					173 02	10 65	
Military		7 17	4 50					11 67	
English History			11 70				26 50		14 80
Sewing		52 65	50 35		7 25		88 10	7 65	
Book-keeping			7 75					7 75	
Dwelling, etc.	4,600 00					4,600 00			
Totals	$11,600 00	$52,657 43	($10,178 23)	$5,248 65	$47,810 89	($10,178 23)	$24,532 93	$33,236 55	$36,074 29
State treasury				2,385 11				2,385 11	
Grand totals				82,069 42			82,522 05	35,621 66	36,074 29
Balance				452 63				452 63	

SOURCES OF INCOME, 1885–86.

STATE TREASURY.		
Interest on school bonds, 10 per cent	$2,635 25	
Interest on school bonds, 7 per cent	6,214 36	
Interest on school bonds, 6 per cent	8,602 74	
Interest on municipal bonds, 10 per cent	220 00	
Interest on municipal bonds, 8 per cent	408 00	
Interest on municipal bonds, 7 per cent	336 00	
Interest on municipal bonds, 6 per cent	8,929 63	
Interest on real-estate securities, 8 per cent	450 67	
Interest on land contracts, 10 per cent	10,337 49	
Interest on delinquent interest	460 75	
Total		$38,594 89
COLLEGE DEPARTMENT.		
Rent of buildings	$169 00	
Special fees from students	565 00	
Sales of produce, stock, etc	5,374 34	
From appropriations	722 55	
Total		6,830 89
Grand total		45,425 78

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1886.

EXECUTIVE DEPARTMENT.		
Farms and grounds	$34,300 00	
College buildings	104,350 00	
Furniture, tools, etc	5,273 65	
		$143,923 65
FARM DEPARTMENT.		
Barns, sheds, etc	$9,500 00	
Furniture and fixtures	274 00	
Teams — horses and mules	450 00	
Cattle, 39 head	7,540 00	
Swine, 41 head	665 00	
Implements and harness	2,407 00	
Produce in barn	228 25	
Crops on ground	346 00	
Fish ponds	150 00	
Wells	155 00	
Fences	757 00	
Miscellaneous	56 50	
		22,528 75
HORTICULTURAL DEPARTMENT.		
Orchards and plantations	$1,900 00	
Greenhouse and fixtures	3,183 28	
Greenhouse stock, and tools	1,100 20	
Furniture, apparatus	1,031 05	
Tools, implements and team	786 30	
Stock in nursery rows	159 50	
		8,160 33
CHEMICAL DEPARTMENT.		
Chemicals	$278 15	
Chemical apparatus	1,978 85	
Balances, weights and measures	390 00	
Photographic apparatus	45 15	
Platinum ware, wire, etc	96 55	
Mineral collections	1,054 00	
Cases and furniture	516 25	
Analytical tables, with steam, gas and water	1,282 55	
Miscellaneous	6 35	
		5,647 85
NATURAL HISTORY DEPARTMENT.		
Apparatus, tools, etc	$209 40	
Models	83 00	
Museums	3,761 90	
Museum, Scientific Club	196 00	
		4,250 30
PHYSICS AND ENGINEERING DEPARTMENT.		
Engineering instruments	$590 00	
Physical apparatus	1,219 00	
		1,809 00

SUMMARY OF GENERAL COLLEGE INVENTORY—CONCLUDED.

MATHEMATICAL DEPARTMENT.		
Apparatus, charts, etc		$8 25
PRINTING DEPARTMENT.		
Presses, type, cases, etc	$2,718 03	
Supplies	511 60	3,229 63
TELEGRAPH DEPARTMENT.		
Batteries, lines, tools, etc	$920 35	
Supplies, books, etc	54 50	974 85
MECHANICAL DEPARTMENT.		
Tools, carpenter shop	$1,713 50	
Tools, blacksmith shop	429 70	
Lumber and other stock	420 15	
Supplies	62 75	2,626 10
INDUSTRIAL ART DEPARTMENT.		
Tables, models, patterns, tools, etc		831 02
DOMESTIC DEPARTMENT.		
Kitchen utensils	333 85	
Dairy apparatus	87 30	421 15
SEWING DEPARTMENT.		
Machines	$190 00	
Furniture, etc	329 95	519 95
MUSICAL DEPARTMENT.		
Pianos and organs	$1,128 27	
Furniture	23 80	1,152 07
LIBRARY DEPARTMENT.		
Books and pamphlets	$8,782 74	
Furniture	652 46	
Catalogue	963 83	10,399 03
MILITARY DEPARTMENT.		
Cases, tools, etc	$107 75	
Uniforms	471 85	579 60
ENGLISH AND HISTORY DEPARTMENT.		
Maps, charts, etc		26 50
TREASURY DEPARTMENT.		
Notes on hand		590 00
Total		$207,678 03

In presenting this summary, I must not fail to give due recognition to the services of Mr. I. D. Graham, Assistant Secretary, to whose fidelity and attention the correctness of accounts is due. As this office keeps a transcript in some form of all transactions concerning the College through the offices of the State Treasurer, State Auditor, the College Land Agent, Loan Commissioner, and Treasurer, as well as with each buyer of College land, and each school district whose bonds are purchased, the burden is no slight one. Yet it has been worth the pains so far, and it seems necessary to have one office in which all accounts shall verify each other, and contain the data for showing the exact condition of all funds at any moment.

Quarterly auditing of accounts with all the officers of the Board, is shown in the records of this office, and all investments, expenditures and receipts are represented by proper vouchers, filed in the fire-proof vault connected with it. These records and vouchers are accessible at a moment's notice for verifying any facts that may be named in connection with the finances of the College.

Respectfully submitted.

GEO. T. FAIRCHILD,
Secretary of the Board of Regents.

COLLEGE, MANHATTAN, KANSAS, July 1, 1886.

ANNUAL REPORTS

OF

COLLEGE DEPARTMENTS.

1884-85.

REPORTS.

PRESIDENT'S REPORT, 1884–85.

To the Board of Regents—GENTLEMEN: Herewith I present a succinct account of the general progress of the College during the year ending June 30, 1885, together with a statement of the special work of the Executive Department, including an account of expenditures. For detailed account of the several departments, you are referred to the separate reports of the various officers, presented at the same time.

The year has been one of general prosperity and improvement. Though the completion of the College building was delayed for two months beyond the opening of the College year, no very serious friction was caused. The increased number of students was handled, however, with less freedom of movement, and the usual good order was maintained with much more care. At the opening of the winter term the south wing was fully equipped for use, and the classes found immediate need for the added room.

The general health of students and officers has been excellent. No case of serious illness has occurred, and none of the occasional interruptions by minor contagions have occurred. The College has had remarkable exemption for years from disease. During almost six years of my connection with it, no death has occurred among either officers or students, nor has any sick student been carried home to die.

The discipline maintained has been satisfactory to all concerned. No serious misdemeanor has been reported, and no difficulty, beyond that of keeping so many at good work, has been experienced. In two cases willful and continued absence from classes without excuse rendered, led to suspension from the privileges of the College. In some half-dozen or more instances parents were requested to withdraw students who had failed to maintain standing in classes, with the privilege of further trial at the beginning of another year.

The general exercises have included the usual gathering in chapel every morning, in which Professors Nihart, Lantz and Cowles have assisted me; the lectures and public rhetorical exercises, and the socials. The following lectures were given in chapel at the Friday afternoon hour in the different months named:

SEPTEMBER	The Boy from the Country, and his Sister	Prof. Lantz.
OCTOBER	Work and Wisdom	Pres. Fairchild.
NOVEMBER	Economic Entomology	Prof. Popenoe.

January—Conquest of England	Prof. Cowles.
February—Sights and Scenes in the Crescent City	Mrs. Kedzie.
March—Elements of Success	Supt. Thompson.
April—Friends with Fins	Sec. Graham.

In May the time for the regular lecture was given to Hon. B. G. Northrup, of Connecticut, for an entertaining lecture upon "Memory." Evening lectures were given under the auspices of the various societies as follows:

Before the Scientific Club, Prof. F. H. Snow, of the State University, upon "Prehistoric Man."

Before the Alpha Beta Literary Society, Hon. Noble L. Prentis, upon "The Temptations of Smith."

Before the Webster Literary Society, Hon. C. O. Wheden, of Lincoln, Nebraska, class of '71 in this College, upon "A Dark Page in History."

The general social gatherings were three in number, November 27th, February 28th, and May 8th, at each of which music and literary exercises formed an essential part of the programme, the whole of the main building being thrown open to friendly greetings of students, members of the Faculty and invited friends.

The Faculty organization has remained essentially the same as heretofore, with slight changes, and has met in regular weekly sessions throughout the year. General unanimity has marked the action of the Faculty everywhere. Mrs. E. E. Winchip, the only new member, has won especial commendation in the Sewing Department.

The attendance of students has been slightly in advance of any previous year, a total of 402, of whom 281 were males and 121 females. They were classified as follows:

Resident graduates	5
Fourth year	16
Third year	36
Second year	71
First year	271
Special courses	3
Total	402

These represent 61 counties of Kansas and 14 other States. More complete data of comparison I reserve for the report of next year, the year of publication in the biennial report.

The following students, fourteen in number, completed the course and graduated on June 10th, with the degree of Bachelor of Science:

Thomas Bassler	Philadelphia, Pa.
Albert Deitz	Kansas City, Mo.
George E. Hopper	Manhattan, Riley Co.
Florence F. Hough	Melrose, Iowa.
Frank A. Hutto	Manhattan, Riley Co.
Allan Lewis	Topeka, Shawnee Co.
Nellie J. Murphy	Tabor, Clay Co.
Arthur L. Noyes	Wabaunsee, Wabaunsee Co.
Clarence D. Pratt	Silver Lake, Shawnee Co.

Rollin R. Rees	Minneapolis, Ottawa Co.
Frederic J. Rogers	Burrton, Harvey Co.
Dorothea E. C. Secrest	Randolph, Riley Co.
Grace Wonsetler	Verbeck, Barton Co.
Effie E. Woods	Randolph, Riley Co.

The degree of Master of Science was conferred upon Warren Knaus, of the class of '82, for proficiency in economic entomology.

The series of Farmers' Institutes was as follows: Hiawatha, Brown county; Pomona, Franklin county; Winfield, Cowley county; Sabetha, Nemaha county; Beloit, Mitchell county; Ellsworth, Ellsworth county.

In those at Pomona and Beloit I took the usual share of duties, and gave besides an address before the annual meeting of the State Board of Agriculture.

The usual routine of duties has occupied my energies constantly, not the least being care for the perfection of details in the buildings under contract. The general accounts have been kept by Secretary Graham, with my supervision, but most of the correspondence has still been maintained by my own hand.

My class work has been the care of the fourth-year class in Psychology, Logic and Political Economy, the number being about sixteen during the year. In these I have striven to especially encourage genuine thought and honest conviction upon inquiry, rather than to cram with my own opinions.

Of outside work in the State, I have done little beyond attention to the duties belonging to me as a member of the State Board of Education, and to share in the annual meeting of the State Teachers' Association. I attended, under your direction, the meeting of the National Educational Association at Madison, Wisconsin, and was able in the tour to visit three of the land-grant Colleges in Wisconsin, Iowa and Nebraska, and to call at several other colleges in the same States. I am under obligations to the Board for this privilege of gathering information for my work here.

My especial responsibility includes direct charge of a property amounting now to $128,244.15, with incidental attention to all the interests of the College.

The expenditures of this department include a great variety of interests, which may be analyzed as follows:

EXPENDITURES AND RECEIPTS.

EXPENDITURES.		
Offices of President and Secretary:		
Postage (all departments)	$413 54	
Stationery	89 39	
Furniture	279 81	
Student labor	130 00	
Notary public	7 50	
		$920 24
Care of buildings, heating, etc.:		
Fuel	$2,364 44	
Lights	68 10	
Tools	83 83	
Janitor	580 00	
Fireman	250 00	
Students' help	595 35	
Washing towels	52 25	
		3,993 97
Buildings:		
Repairs	$352 05	
Improvements	901 63	
		1,253 68

EXPENDITURES AND RECEIPTS — CONCLUDED.

Grounds, drives and walks:		
Care	$70 15	
Improvement	1,217 55	
		$1,287 70
General class rooms:		
Furniture	$2,502 08	
Incidentals	138 29	
		2,640 37
Advertising:		
By Industrialist	$151 20	
By other papers	273 62	
		424 82
Catalogue:		
Printing 4,000	$235 50	
Maps	20 00	
		255 50
State Fair		152 45
Farmers' Institutes, six		293 10
Lectures and addresses:		
B. G. Northrop	$10 00	
A. D. Mayo, annual address	50 00	
Printing 500	16 50	
		76 50
Traveling expenses of the President:		
To National Educational Association	$72 70	
To State Board of Education, six meetings	33 43	
To Topeka, five times	30 82	
		136 95
Carriage for Regents, six meetings		73 00
Commission on sale of real estate		90 00
Museum collections		45 90
Gymnasium materials		8 00
Rent of house for gardener		120 00
Total		$11,772 18
RECEIPTS.		
Rent of buildings, etc	$208 50	
Sale of 160 acres of real estate	1,840 00	
Sale of fuel, etc	210 09	
		$2,258 59
Bills against departments		$485 14
Increase of inventory		28,566 25
Actual expense over improvements		1,863 34

In conclusion, I must commend to the Board all of the Faculty, who have rendered efficient service in their several departments, and especially those who have been my immediate assistants in executive duties.

Respectfully submitted.

COLLEGE, June 30, 1885. GEO. T. FAIRCHILD, *President.*

FARM DEPARTMENT, 1884–85.

To the Board of Regents — GENTLEMEN: Your attention is respectfully invited to the following report of operations in the Farm Department for the year ending June 30th, 1885.

The work and duties of the department are naturally classified under the heads, operations in the class room and operations upon the farm.

In the fall term, my class in agriculture consisted of fourteen young men, of the Senior class with two exceptions. In the winter term, thirty-four young men, for the most part of the second year, received regular instruction in agriculture; and in the spring term I had charge of eleven students of the Senior class in the study of the United States Constitution. During the entire year I had charge of the third-year class, thirty-five in number, in elocution. A class of thirty-four male students of the third year worked regularly upon the farm during the fall term, and twenty-one male students of the second year in the spring term reported regularly for work upon the farm, agreeable to the plan inaugurated in 1882. Both classes in "farming" were divided into two divisions, which worked alternately by half-terms upon the farm and in the Horticultural Department, doing two and one-half hours of work twice each week — the equivalent of one hour per day "Industrial" of other departments.

Of the zeal and industry of the students of the department I can only speak in terms of praise. Whether the tasks assigned involved labor of the head or hands, they have, with very few exceptions, been cheerfully and industriously performed, and with the evident determination to make the most of the duties and privileges of the College.

Of the course of instruction given in the department, it does not seem necessary that I should speak in detail. This is perhaps sufficiently indicated in the general College catalogue under the heading "Outline of Instruction," (see p. 26,) and the general plan here laid down has been followed; but I have not hesitated to vary from this according to the suggestions of experience.

The general editorial oversight of the *Industrialist*, I have retained throughout the year. This work, involving as it does the weekly examination of our exchanges, some 250 in number, and selection of quoted matter, except that of the educational column, the work of the local page and a share of the writing for the editorial page, has been a duty of very considerable magnitude. I have, however, been constantly assisted in all this by members of the Faculty, particularly President Fairchild, Professor Walters, and Supt. Thompson.

In the work of the Faculty at Farmers' Institutes, I have taken a considerable share. Of the six institutes in which the Faculty participated during the past winter, I have worked in five, held at the following-named places: Beloit, Ellsworth, Hiawatha, Sabetha, and Winfield. At these farmers' gatherings, the aim has been to present accurately, but in popular terms, the work of the College farm, and particularly its experimental undertakings. I have, from the first, been greatly interested in the success of these meetings of the farmers and the College Faculty, feeling that from them good would come to both. It gives me pleasure, therefore, to say of the institutes of last winter, that in attendance, interest and thoroughness of preparation on the part of the local committees, they were much more than ordinarily successful.

THE FARM.

During the year covered by this report, more and better improvements have been made, especially in the line of machinery; and in general the department has made a more marked growth than can be shown of any two or three years of the history of the College farm. I shall have occasion to refer to the improvements in detail under appropriate headings.

The agricultural season has been one of those rare ones favorable alike to all field crops. This will be seen by a reference to the figures furnished by the principal fields in which staple crops were grown: thus, wheat gave a yield of thirty-four bushels per acre, costing, in cultivation and marketing, thirty-two cents per bushel; corn fifty-five bushels per acre, costing twenty cents per bushel; oats, forty bushels (estimated), which cost eighteen cents per bushel to raise; while millet hay yielded two and eighty-seven hundredths tons per acre, each ton costing, in the condition of good hay in the stack, two dollars and twenty cents. The yield of tame hay was also very large, considered in the aggregate or per acre. Already we place our dependence almost entirely upon the cultivated grasses and clover for both hay and pasturage. During the year we have harvested something over seventy-five tons of "tame" hay, for the most part orchard-grass and clover.

THE STOCK.— Not many changes have taken place in the herd since my last report. The Jersey bull "Excelsior," which died late in the fall with inflammation of the bowels, and several calves which perished at birth, are the principal casualties of the year. The general health and vigor of the herd has been such as to leave nothing to be desired in that direction. Our sales of stock have been very considerable, aggregating $1,655.20, although, excepting a single Jersey heifer, no female of breeding age has been sold. I am glad to be able to report a large and increasing number of sales to old students and their friends. Our purchase of live stock during the year has been inconsiderable — a Jersey bull, purchased of Mr. Wm. Brown, of Lawrence, to take the place of the one that died early in the season; a Jersey heifer, purchased of L. D. Hoadley, of Lawrence; and a young Berkshire boar and Essex sow, complete the list of our stock purchases for the year covered by this report. I have succeeded also in exchanging our old Galloway cow, Lassie, for a yearling Galloway bull, bred by Dr. A. M. Callaham, of Topeka. By this arrangement the College becomes the owner of both male and female of this well-known breed.

FENCES AND BUILDINGS.— During the last session of the Legislature, appropriations for buildings for use by the Farm Department were made as follows: For an experimental barn, $4,500; for the erection of a cattle-shed and corn-crib, $1,100. Plans for the experimental barn were submitted to the Board, and by them adopted at the April meeting. Since then contracts for the work have been let, and at this time work on the buildings is well under way. The plan of the barn I arranged, after a considerable correspondence upon the subject with well-known agricultural experimenters in the East, and I have reason to believe that the arrangement of the building will be suited to the future of the College farm, no less than to its present condition and wants. For much of the details of the barn — the drawing and making out specifications — I am indebted to the technical skill of Prof. Walters. Plans for the cattle-shed and corn-crib I expect to lay before you at an early day.

Very large additions have been made to the conveniences of the farm in the way of fences. Nearly 100 rods of barbed-wire fence, having three wires, and posts averaging about twenty feet apart, and some 60 rods of board fence and combination board and wire fence, with posts eight feet apart, have been constructed. The needs of the herd and the improvements being made at the old College farm will probably necessitate further work in this direction during the coming year.

MACHINERY.— Numerous, important and very expensive additions have been made to the stock of farm machinery since my last report. The following are the principal items of this improvement, with the cost of each laid down in Manhattan: One ten-horse-power vertical engine and boiler, with patent automatic cut-off, manufactured by B. W. Payne & Sons, Elmira, N.Y., together with smoke-stack, shafting, pulleys, hangers, and best leather belting for engine, thresher and grinder, $702.99; Wheeler's thirty-inch cylinder thresher and cleaner, manufactured by Wheeler & Melick, Albany, N. Y., $232.32; No. 2 Nonpareil grinder, with chilled-iron grinding surfaces, manufactured by J. Sedgebeer, Painesville, Ohio, $49.95; Buckeye two-hole sheller, with cob-carrier and eight-foot elevator, sold by Deere, Mansur & Co., Kansas City, Mo., $39.52; Thompson hay-tedder, sold by Hoover, Rhodes, & Co., Kansas City, Mo., $41.90. One McCormick's five-foot-cut steel harvester and binder, $175. In all of the above items liberal discounts from catalogue prices were given the department.

Donations have been received as follows: Strowbridge's broadcast seed-sower, manufactured at Des Moines, Iowa, and the Eclipse post-hole digger, manufactured by Cole & Fleming, of Springfield, Mo. Limitations of time and space compel brevity in what I have to say of the merits and demerits of these machines. They have all been in operation more or less during the year, and during this time they have been objects of careful attention to scores of farmers and others interested in them.

The Payne automatic engine, since we have become acquainted with its peculiar mechanism, has proved very satisfactory. It is an excellently made engine; the materials of which it is constructed are apparently the best; it is wonderfully economical in fuel, and apparently develops considerably more than the nominal horse power.

The Wheeler thresher would have been much more useful to us, with the abundant power at our disposal, had it possessed greater capacity. Designed as it is for a two-horse tread-power, our powerful engine gives to it such a strong motion that the temptation to over-feed is too strong to be resisted, in which case the sieves clog and poor work is done. When worked within its capacity — 12 to 25 bushels of wheat and 20 to 30 bushels of oats per hour — it threshes and cleans the grain well. In the near future, when Kansas farmers are compelled to carefully husband all fodder, including straw, there will be a demand for machines of the Wheeler pattern, which, with a small force, can be operated day by day as fast as the straw is demanded.

The No. 2 Nonpareil grinder has put our engine to its full working capacity. It grinds grain of all kinds, including corn in the condition of ears, grinding hourly of ear corn about twelve bushels, and twice as much shelled corn, to the condition of chop. It is a well-constructed and very durable machine, and where sufficient power is available, I cannot think of a better one.

Our Buckeye sheller, although highly recommended, has not been altogether satisfactory; its parts are not well adjusted to each other, or well put together, and it has not done clean work. Possibly a fuller acquaintance with it will enable us to remedy some of these defects.

The McCormick binders are too well known to require extended mention at my hand. Ours has done its work perfectly from the start, rarely missing a bundle, and being easily accommodated to inequalities of the grain and ground. In the quality of the materials of which it is made and in workmanship, it seems to me to leave little to be desired.

The hay-tedder is almost unknown in Kansas husbandry. We have used the Thompson tedder through most of two haying seasons, and have learned to regard it as well-nigh indispensable in the hay-field, particularly where "tame" hay or millet is to be gathered. Indeed, I am disposed to doubt if tame hay can be successfully made in Kansas without the use of this machine.

At the June meeting of the Board, I was authorized to purchase the shafting, pulleys, belting, etc., together with ensilage cutter, fanning mill, and steam pump, for use in the new experimental barn. Beyond the items then allowed, I am unable to think of any machinery or implements likely to be required during the coming year, except a few small tools like hoes, forks, shovels, and the like.

EXPERIMENTS.— Considerable work in the line of experimental investigation has been done during the year, and quite satisfactory results reached in many cases. The details of these experiments have been published in a pamphlet of forty-six pages, issued by the Printing Department of this College. Five thousand copies of this report on experiments have been published, and these have been rapidly distributed. The drift of this experimental work is sufficiently indicated by the following list of subjects treated in this report:*

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* This report is found in Appendix A of this volume.

Corn meal and corn-and-cob meal for fattening steers.
Corn-and-cob meal for pigs.
Deep and shallow plowing and thorough cultivation for corn.
Experimental grasses and clovers.
Farm-yard manure applied to millet ground.
Pork product of half an acre of alfalfa.
Shrinkage of corn in the crib.
Wheat continuously on the same ground.

The experiment in feeding corn meal and corn-and-cob meal to steers has been repeated during the past winter. Experiments having for their object to determine the value of pasture to store hogs, the effect of various manures and harrowing upon growing wheat, the effect of manure and subsoiling upon corn, and different methods of planting the same, are in progress, and these, with the experiment in feeding above referred to, and other experimental work to be planned for the coming winter, will form the matter of my next annual report of experiments.

FINANCIAL STATEMENT.

	Dr.	*Cr.*
To valuation, June 30, 1884	$16,388 18	
To vouchers approved	5,576 81	
By valuation, June 30, 1885		$18,340 43
By amount received for stock, produce and labor		2,669 69
By amount expended for fences not inventoried		145 90
By amount expended for experiments not inventoried		584 78
By balance		224 19
Totals	$21,964 99	$21,964 99

Respectfully submitted.

E. M. SHELTON,
Professor of Agriculture, Supt. of Farm.

COLLEGE, July 1, 1885.

CHEMICAL DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: My work for the year ending June 30, 1885, has principally been the teaching in the regular course. During the year I have had one hundred and seventeen different students in my classes, as follows:

FALL TERM.—Physics and Meteorology, fifteen; Inorganic Chemistry, two classes, thirty-two and thirty-three. The recitations of the last-named class were heard in two divisions, and for the purpose of experimental practice they formed three sections, meeting on as many days per week, thus practically giving me four classes daily.

WINTER TERM.—Agricultural Chemistry, thirty-eight; Organic Chemistry, two classes, twenty-four and twenty-six; Mineralogy, two classes, twenty-nine and twenty; Blow-piping, four sections, forty-nine. The forty-nine students in the mineralogy classes met in four sections for their blow-pipe analysis and determinative mineralogy. Three of these classes in blow-piping were under the immediate charge of my assistant, Mr. Willard. I met the other four classes daily.

SPRING TERM.—Chemical Physics, thirty-two; Chemical Analysis, thirty-six. The latter class worked two hours each day. A class of this size in this chemical work requires the constant daily attention of both myself and my assistant. There have been two special students in my department during the year.

In addition to the work already mentioned as coming to Mr. Willard's lot, has been the assistance given to the students in their practice and in the preparation of these and the class-room experiments, in the instruction of special students, and in the general work of the department, including several analyses for outside parties. As regards the quality of the work done by the students in my department, I can only say that while I am conscious of room for better results, I think their work has been reasonably good. As an illustration of the practical work of the students, the number of substances, liquids and solids, analyzed by the class of thirty-six may be mentioned. In this case each student works independently, and the amount accomplished varies with the special aptitude of the student. Some students analyzed only sixty substances, more or less difficult, while others analyzed more than one hundred.

I have not thought that this course should be shaped, primarily, to qualify the student for an analyst; but rather as a means of familiarizing him with the qualitative chemistry of the elements and their compounds. This seems the proper object, since so few of our students will have occasion to use their knowledge as analysts. Of course, the two courses are intimately related; but in practice the one follows formulas and directions, the other seeks, rather, the reason for these same formulas and methods. I know of no concise text-book which fully meets the demands of the latter method. I have therefore modified the manuals to more nearly give what I have wanted, but finding this not entirely satisfactory, I have in course of preparation a small book for use in my classes.

The ventilators placed in the roofs of the laboratories are very serviceable. By giving sufficient ingress to the air below, there is no difficulty in keeping the atmosphere of the work-rooms reasonably pure. These ventilators also add much to the appearance of that part of the building. I think the good end served by them should lead to putting ventilators of the same general plan on the other wings.

During the year, there have been notable additions to the chemical glassware which goes to make up the appliances of a laboratory, and a few mportant additions to the physical apparatus. An enumeration of these would be out of place here.

I have had my part in the work on the *Industrialist*, and in the Farmers' Institutes.

The financial showing of the department is as follows:

EXPENSES, CASH.	
Chemicals and chemical apparatus	$437 47
Physical apparatus	63 25
Freight	35 82
Students' pay-roll	32 15
Additions to the fixed furniture	131 86
Total	$700 55
Department bills	$529 02
RECEIPTS.	
Cash	$108 10
Department bills	57 00

Respectfully submitted. G. H. FAILYER,
COLLEGE, July 1, 1885. *Prof. of Chemistry and Physics.*

DEPARTMENT OF HORTICULTURE AND ENTOMOLOGY, 1884–85.

To the Board of Regents—GENTLEMEN: I have the honor to present the following report of operations in the Department of Horticulture and Entomology, for the year ending June 30, 1885.

CLASS WORK—SCHEDULE.

Studies.	*Males*	*Females*	*Total*
FALL TERM.			
Horticulture	31	17	48
Rhetoricals (through year)	19	15	34
Horticulture, Industrial	15	3	18
WINTER TERM.			
Horticulture, Industrial (greenhouse)	....	2	2
SPRING TERM.			
Entomology	25	17	42
Horticulture, Industrial	24	....	24
Totals	114	54	168

In addition to the above classes pertaining properly to my department, I was placed in charge, during the winter, of a first-year class in geography, comprising thirty students.

THE GROUNDS

Have received a larger proportion of the time expended in work by the department than usual, consequent to the adoption of a plan for the final planting of the grounds, proposed by Mr. M. G. Kern, of Columbia, Mo.

This plan necessitated the planting of considerable additions to belts and groups previously established, the extension of others, the planting of some new ones, the construction of new drives and walks, the modification of some already planned, and some regrading about the buildings and elsewhere.

In accordance with an estimate made by Mr. Kern, I requested of the Board an appropriation of $200 for the purchase of trees for the immediate planting contemplated by the plan. The expenditure of this sum, and a few small sums expended for specific purchases, added to our lists of varieties and species as follows:

Fruit Trees and Plants: Apples, 9; pears, 35; peaches, 41; cherries, 14; plums, 13; apricots, 2; grapes, 28; blackberries, 2; ornamental trees and shrubs, 180; hardy perennial flowering plants, 41.

We have also received by gift, additions as here specified: From George P. Peffer, Pewaukee, Wisconsin, root-grafts of five sorts of northern apples not previously on our lists; from Messrs. A. J. Caywood & Son, Marlboro, New York, plants of some of the promising grapes, and other small fruits, originated by themselves; from Mr. T. V. Munson, Denison, Texas, trees of new varieties of peaches and plums; from Thomas Meehan, Germantown, Pennsylvania, a large number of choice trees, shrubs, and hardy perennials; from Mr. Abner Allen, of Wabaunsee, Kansas, cions of a few new or rare apples and plums; from Mr. Harvey Stiles, Pavilion, Kansas, plants of Jumbo strawberry, and cions of promising seedling apples; from T. C. Wells, of this place, plants of a choice seedling strawberry.

The stock added by purchase and gift came to hand mostly in good order, and by careful handling was planted with less loss than might have been expected, and now gives promise of important and valuable additions to our list of profitable fruit and ornamental plants. Stock on hand has been properly re-handled, selected and transplanted as required by the improvements in progress, while considerable additions have been made by propagation.

IN THE GREENHOUSE

The facilities for growing fine specimen plants have been increased by the construction of a rose-bed in the east house, and in the south house a large central bed suitable for planting out the larger specimens.

The introduction of apparatus for lifting and closing the ventilators has proved a most desirable change.

The demands upon the greenhouse for material to be used in the planting of the beds on the lawn have increased rapidly each year, until now a very considerable proportion of the time of the gardener is employed in the direction of such planting and the subsequent care of beds and surrounding grounds. Though less attractive the present season than usual, owing to the unfavorable weather of spring, the beds are still indispensable, and, in adding to the general appearance of the grounds, are worth all they cost.

I have had, as heretofore, not only the management of the orchards and fruit and ornamental plantings, but also the general management of the grounds, the making and repairing of the drives, the mowing of the lawns, and similar work. I have also taken my part in the general work of the Faculty, on committees, in the *Industrialist*, and before Farmers' Institutes.

Respectfully submitted. E. A. POPENOE,

COLLEGE, July 1, 1885. *Professor of Horticulture and Entomology.*

DEPARTMENT OF BOTANY AND ZOÖLOGY, 1884–85.

To the Board of Regents—GENTLEMEN: During the past year, I have taught classes, with the number of students as follows:

Elementary botany	110
Structural botany	16
Special botany	4
Zoölogy	22
Special zoölogy	1
Physiology	49
Geology	16
Rhetoricals	46

I have added to the collections many specimens from the local fauna and flora. The other important additions to the Museum were:

1st. A set of marine invertebrates in alcohol, presented by the Smithsonian Institution.

2d. A set fishes in alcohol, presented by the eminent icthyologist, President D. S. Jordan, of the Indiana State University.

3d. The skeleton of the noted Berkshire, "Lord Liverpool," prepared by the department, and mounted by Ward, of Rochester.

4th. A set of botanical specimens, consisting of flowering plants and fungi, collected by the undersigned in southwestern Kansas.

The expenses of the department are shown in the following table:

CASH.		
Class room supplies		$10 63
Museum supplies and specimens		156 10
Implements and apparatus		157 10
Expressage and freight		28 06
Pay-roll		68 45
DEPARTMENT BILLS.		
Labels and printing	$11 60	
Tables and case	100 80	
Shelves, boxes, etc	17 70	
		130 10
Total		$550 44

Respectfully submitted.

W. A. KELLERMAN.

COLLEGE, July 1, 1885.

DEPARTMENT OF MECHANICS AND ENGINEERING.

To the Board of Regents—GENTLEMEN: I present the following report of the work done in my department for the College year of 1884–85.

FALL TERM.—Arithmetic, 55; Trigonometry, 30; Writing (two divisions), 75.

WINTER TERM.—Mechanics, 24; Bookkeeping (three divisions), 114.

SPRING TERM.—Engineering, 18; Bookkeeping, 15; English, 19.

As may be seen by the statement, the work in my department proper consisted of Trigonometry during the fall term, Mechanics the winter term, and Engineering the spring term. The time was so economized that much more field-work was done than the year before. The elementary part of Trigonometry was accompanied with instruction upon the use of transit and level, that practical surveying might be finished before cold weather set in. Four failed to pass the required examination.

The course in Mechanics and Engineering has been practically the same as last year. Much more draughting, however, has been done, and practical treatises on important topics have been written and read by each pupil. Common subjects, such as building materials, mortars, frames and common roads, were thoroughly discussed and illustrated.

The work done in Writing and Bookkeping was satisfactory, the plan pursued being the same as outlined in my former report. I would recommend one class in writing during each term of the year. Its importance and demand require it. As it is now, many pupils have no opportunity of taking this drill.

Respectfully submitted. B. F. NIHART,
COLLEGE, July 1, 1885. *Professor of Mechanics and Engineering.*

DEPARTMENT OF MATHEMATICS, 1884–85.

To the Board of Regents—GENTLEMEN: I have the honor of submitting to you a report of work done in my Department during the past College year.

FALL TERM.—During the fall term four classes were under my instruction—two in Arithmetic and two in Algebra. The enrollment in the former study was one hundred and one; in the latter, fifty-eight.

The classes in Arithmetic were composed of students of the first year. They were given a review of the more important topics in that study, with special reference to their preparation for business, and to their training in logical reasoning and analysis.

The Algebra classes comprised members of the second-year class in the

College course. In this branch the equation, in its various forms, its transformations and its applications to the solution of problems and the demonstration of theorems, were investigated. The classes had become familiar with algebraic notation and processes during the spring term of the previous year. Notwithstanding this preparation, I deem the fourteen weeks of the fall term too short a time to accomplish all that should be done in this study.

WINTER TERM.—In the winter term four classes were in my care—two in Geometry, one in Word Analysis, and one in United States History. In Geometry the enrollment was fifty-two; in Word Analysis, thirty-three; and in U. S. History, fifty-six.

In Geometry the classes had the advantage of an acquaintance with geometric forms and their construction, this having been acquired in Geometrical Drawing. With this preparation, rapid progress is made in acquiring the demonstrations of theorems. In this class special attention was given to *logical expression*, both in oral and written demonstrations. The class completed the plain geometry as in Wentworth's text-book.

In Word Analysis and U. S. History the classes took the course of study usually followed in the Department of English and History. The methods of conducting recitations were varied. In History the topical plan was mostly followed, as the pupils secure greater benefit from the recitation.

SPRING TERM.—In this term I instructed three classes in Algebra and one in Solid Geometry. In Algebra the enrollment was one hundred and one, and in Geometry forty-one.

In Solid Geometry, besides the theorems usually demonstrated, the class was given many theorems for original thought. The practical applications of principles to problems in mensuration were made a prominent feature of the work.

In Algebra the literal notation and fundamental processes were thoroughly studied. The importance of clear definitions for the terms used was fully impressed upon the mind. The equation in its simplest forms was investigated. The secondary processes of composition and factoring, with a consideration of common factors and multiples, were fully dealt with. In this term's work thoroughness before progress has been the aim, and the results have been unusually satisfactory.

The expenses of my department for the past year, aside from expenses for crayons and repairs, have been, for printing, $2.

Respectfully submitted.

COLLEGE, July 1, 1885. D. E. LANTZ.

MILITARY DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: I have the honor to submit the following report for the College year ending June 30, 1885.

During the year the instruction in this department has been similar to that in previous years. Drills have taken place three times a week during each term. The drills were held during one of the regular College hours.

A limited amount of time was devoted to target practice, this exercise taking place on Saturdays.

A reasonable degree of proficiency has been attained by all attending drill, and a large proportion have become very well drilled.

In addition to the regular work of my department, I have had charge of two classes in Arithmetic, and assisted during the spring term in Geography.

The numbers enrolled in the several classes during the year are given in the following table:

TERM.	DRILL.		MILITARY SCIENCE.		ARITHMETIC.		GEOGRAPHY.	
	Began..	*Com....*	*Began..*	*Com....*	*Began..*	*Com....*	*Began..*	*Com....*
Fall	91	87	27	27	67	64	....	......
Winter	69	71	27	27	98	45	....	......
Spring	63	58	....	....	30	28	11	9

I am, very respectfully, your obedient servant,

W. J. Nichols,

College, July 1, 1885. *First Lieutenant Seventh U. S. Cavalry.*

DEPARTMENT OF INDUSTRIAL DRAWING, 1884-85.

To the Board of Regents—Gentlemen: I have the honor to submit for your consideration the following report of the Department of Industrial Drawing.

During the school year of 1884–85 I have taught classes as shown by the subjoined tabular view:

TERM.	MECHANICAL DRAWING.				FREEHAND DRAWING.			*Total.......*
	First year.....	*Second year...*	*Third year...*	*Advanced.....*	*B class........*	*A class........*	*Advanced.....*	
Fall	150	....	....	7	1	3	14	175
Winter	5	....	....	9	38	94*	12	158
Spring	5	38	24*	8	24	....	7	106
Totals	160	38	24	24	63	97	33	439

* These classes met on alternate days.

The classes in mechanical drawing used Prof. Morse's text-books of mechanical drawing, completing two books each term; and the classes in primary freehand drawing completed from one to five books of Prof. White's series.

The students enumerated in the column "Advanced Mechanical" used a variety of text-books and works of reference, according to their ability and intended vocations. The majority worked from Prof. Babcock's Text-books of Elementary Architecture. Two students, after completing this work, drew original plans complete, with details and specifications, of simple school houses, churches and dwellings. One student worked from "Stone's Plates of the Steam Engine" and "Armangaud's Machinist."

The advanced students in freehand drawing, mostly female students, drew from geometrical models. After gaining some proficiency in seeing solid forms in space, shaded lithographs of simple objects were copied, gradually increasing the plates in size and intricacy until a degree of freedom with the pencil was reached to permit the study of the human form from the cast and the "flat."

During the winter term each member of the class in surveying drew, under my supervision, a large map, 36x48 inches, of the College farm, as surveyed by them during the fall term. In the spring, each member of the class in engineering drew a thesis plate, 36x36 inches, treating some subject connected with the class work, and selected by the students for special investigation. This work was done on afternoons and Saturdays. In addition to this regular class work, my studio and private library has been constantly open, and my help has freely been given to special students devoting themselves to some particular branch of mechanical study or applied mathematics.

The finished work of the several classes was on exhibition in my class-room during commencement week, and has undoubtedly been seen by you. The exhibition contained nearly one thousand plates, and drew many favorable comments from educators present.

Besides the work of instruction, I have shared in the general work of the Faculty. In January I attended the Farmers' Institute, in Hiawatha, and that at Manhattan, and in February the institute at Ellsworth. As in former years, I prepared weekly a column of "Kansas Educational News" for the *Industrialist*, and read a part of the exchanges. During the winter term I assisted Prof. Maximilian Kern, of the State University of Missouri, in designing a landscape plan of the grounds of this College, and made a large copy of his design for the Department of Horticulture. Another large copy (60x84 inches), in colors, I made for the President's office. Under the direction of President Fairchild, and from his sketches, I drew a set of plans for the Professor's dwelling, now in construction, and made plans and specifications for the experimental barn, designed by Prof. Shelton. The President has also intrusted me with the work of draughting and detailing the reconstruction of the Horticultural Hall, and other improvements. In my opinion it is very desirable, for many reasons, that the College should do its own architectural work, not the least of which is, that it brings the Professor of Industrial Art in close contact with actual and practical work.

The department is greatly in need of a collection of architectural models, a new set of drawing tables, a cabinet with pigeon holes for storing away finished drawings, and inside blinds of suitable construction for the south and east windows of the class room. I would also suggest that a beginning be made of gathering a collection of building material — marbles, granites, tiles, castings, wall-papers, colored and ground glass, etc. Small appropriations of from twenty-five to fifty dollars, made from time to time would soon collect a very valuable museum of these means of illustration.

I take this opportunity to thank you for your kind assistance in everything pertaining to the development of my department, and for my promotion at your commencement session from Instructor in Industrial Drawing to Professor of Industrial Art and Designing.

Respectfully submitted. J. D. WALTERS.

COLLEGE, July 1, 1885.

THE LIBRARY, 1884–85.

To the Board of Regents — GENTLEMEN: I have the honor to present the following report as acting Librarian for the year ending June 30th, 1885.

My work in this direction began just where it ended June 30th, 1884. The Board allowed two hundred dollars for the employment of assistance in cataloguing during vacation. Students who had worked more or less in the library were employed, and began work immediately after the close of the spring term. Two or more students were at work most of the vacation. With the exception of two weeks, I spent a part of each day in supervising their work. The cataloguing was continued throughout the year, but with only force enough to keep pace with the increase in the library by the addition of new books. For explanation of the catalogue, I refer you to the appended sheet printed for hanging in the library.

EXPLANATION OF THE CATALOGUE.

The catalogue is in two parts — first, a catalogue of authors; second, a catalogue of titles and subjects.

THE CATALOGUE OF AUTHORS

Is in the drawers on the west side of the case. In this catalogue *authors' names* stand at the top of the card; under the name stand the names of all the books of that author that are in the library, with their location. Thus:

ALDRICH, THOMAS BAILEY.
From Ponkapog to Pesth.......... 5110. VII. 3. D.
Marjorie Daw..................... 5076. VI. 2. E.

In which 5110 is the number of the book in the record of accessions, and may be disregarded, unless the book is out of the library and it is desired to ascertain the price, binding, publisher, etc. The VII is the number of the *alcove*, and is found in the scrolls above the cases. The 3 is the *case* of alcove VII, in which the book belongs, and is painted at the top of the case. The D is the *shelf* of case 3, alcove VII, on which the book is found, and is painted on the vertical partitions. Important articles by any author are catalogued, as well as the complete volumes by that author. If more than one card is required for the works of any author the cards are numbered after the author's name, (1), (2), etc. If you know who wrote the book or article that you want, use this part of the catalogue.

CATALOGUE OF TITLES AND SUBJECTS.

This is in the drawers on the east side of the case. It contains: (1) The titles of books as they appear on the outside, catalogued under the first word not an article; (2) the same titles arranged under other important words, when more likely to be sought than the first; (3) the titles of chapters and articles which would not be found from the title of the book in which they appear. Thus:

Jackson, Andrew..............William G. Sumner. 349. VII. 6. F.
Same.......John Frost. P. 215, Lives of the Presidents. VII. 6. F.

The name at the right is that of the author; the place of the book is indicated by alcove, case and shelf, as is the catalogue of authors. A number preceding the alcove indicates that the title recorded stands for a *book*, and refers also to the record of accessions; otherwise the reference is to a certain *page in* some book having another title. Under (1) there are numerous exceptions. Titles beginning History of, Elements of, Works of, etc., usually appear, not under these words, but under the subject of which they treat. By far the greater number of entries is included under (3).

The catalogue is on the "dictionary" plan; subjects are to be looked for just as in the dictionary. When, for convenience, several related subjects are grouped under a more general term, cross-references refer to the general term; for example, the breeds of domestic animals are arranged alphabetically under Cattle, Swine, etc.; while under Jersey is found simply the reference, See Cattle; under Berkshire, See Swine, etc.

Novels, however, are arranged alphabetically under Fiction, without cross-references from the titles.

In using the catalogue, be careful not to pull the drawers clear out. Leave the drawers closed when you are through.

It will be an accommodation if those who notice mistakes in the references, or a deficiency of cross-references, will report them to the person in charge of the library.

In addition to the references in this catalogue, consult:

(1.) In looking up any subject, the Cyclopædias in reading room, catalogue of the Brooklyn Public Library on the catalogue case, Poole's Index to Periodical Literature on the revolving case.

(2.) In looking up subjects relating to English books and authors, Allibone's Dictionary of Authors in the reading room, Adams's Dictionary of English Literature in VI, 5 G.

(3.) In looking up historical subjects, Adams's Manual of Historical Literature in VIII, 4 G.

(4.) In looking up agricultural subjects, Index to Patent Office and Department of Agricultural Reports in V, 3 H.

Do not hesitate to ask assistance at any time from the person in charge of the library.

The record of accessions and the catalogue of authors are brought up to date; about two thousand five hundred volumes remain to be catalogued, to bring the catalogue of titles and subjects up to the present extent of the library.

The books were completely overhauled at the close of the spring term, and found in good condition. The general management has been the same as heretofore. The library has been open for reading and for the drawing of books during the College session each day, and at other times when there was any responsible person present to take charge of it. The reading-room, which contains also most of the reference books, has been open throughout the day.

The Faculty, individually and collectively, prepared a list of books to be purchased with the five hundred dollars allowed by the Legislature for the increase of the library. This list was placed, as last year, in the hands of Mr. S. M. Fox, of this place. He simply purchased at the best rates he could obtain, and added ten per cent. to this for transportation and commission. In addition to obtaining the books on these very favorable terms, we are under obligations to Mr. Fox for many courtesies in looking up books out of print or for other reasons not easily obtained.

The increase in the number of books has been, since the last report, as follows: By purchase, 321; by binding periodicals, 74; by donation, 74; by exchange of duplicates, 16; total, 485.

Adding these to the number reported last year, we have a total of 5,559 volumes, not counting duplicates. Of periodicals and pamphlets, unbound, there are probably 1,600.

Naturally the donations to a State institution, aside from public documents, are not very numerous. The most valuable donation received during the year consisted of twenty-two volumes of the Eclectic Magazine in numbers, together with eight more volumes of the same, more or less incomplete, and numerous other periodicals and pamphlets unbound. These were given by T. C. Wells, of this place. A list of the principal donations, with the names of the donors, is appended to this report. Numerous donations of pamphlets and periodicals, though not enumerated here, are fully appreciated.

I append also as a part of this report a list of the periodicals subscribed for from the fund of $150 allowed by the Board for this purpose. It differs but little from the list reported last year. In addition to the list there are received at the reading-room some hundreds of other publications, either as donations or as exchanges with the *Industrialist.* These include several dailies, most of the weeklies published in Kansas, and a considerable number of agricultural and trade journals, religious papers, and other periodicals from this and other States.

DONATIONS.

The following is a list of the principal donations for the year ending June 30, 1885:

From President Fairchild.— Census of Michigan 1874; Proceedings of the Na- Educational Association, 1884; Household Conveniences; Farm Conveniences; Michigan Agricultural Reports, 3 vols.

From Hon. John A. Anderson.— Reports of the Department of Agriculture, 3 vols. Reports of Tenth Census, 8 vols.; Coast Survey Report, 1883; Journal of House of Representatives, 1883; Journal of the Senate, 1883; Report of Chief Signal Officer, 1883; Report of the Comptroller of the Currency, 1883; Official Register of the U. S., 7 vols.

From Michigan Agricultural College.— Life of Richard Cobden; Boswell's Johnson, 5 vols.; Botany for Beginners.

From Vermont Agricultural College.—Apocatastasis.

From Kansas Tract Society.— Life Sketches; Life of William Miller; Life of Joseph Bates; Great Controversy, 2 vols.; Spirit of Prophecy, 2 vols.; History of the Sabbath; Thoughts on Revelation; Thoughts on Daniel.

From T. C. Wells.— Eclectic Magazine, 22 vols. complete, 8 vols. incomplete; Ladies' Repository, and other periodicals in numbers.

From Prof. M. Kern.— Rural Taste.

From Prof. B. F. Nihart.— Commercial Law.

From Supt. G. F. Thompson.—Price-List St. Louis Type Foundry.

From Clark & Maynard.— Reed's Word Lessons.

From State Officers and Secretaries.— Report of University of Minnesota; Report of Ontario School of Agriculture; Report of State Board of Health, Mich., 1883; Transactions of Kansas Medical Society, vol. 1; Report of the Michigan Horticultural Society, 1884; Report of the State Treasurer, Kas., 1883–84; Report of State Supt. Public Instruction, Kas., 1883–4; Laws of Kansas, 1885.

PERIODICALS SUBSCRIBED FOR.

Harper's Bazar; Musical World; Scientific American and Supplement; Nature; Education; The Nation; Eclectic Engineering Magazine; Rural New Yorker; Journal Royal Agricultural Society; American Naturalist; Gardener's Monthly; Manufacturer and Builder; Chemical Society's Journal (London); Electrical Review; American Agriculturist; Penman's Art Journal; Household; Herald of Health; London Quarterly Journal of Microscopy; Eclectic Magazine; Harper's Weekly; Atlantic Monthly; Delineator; Popular Science Monthly; American Journal of Science and Art; Magazine of American History; Harper's Monthly; Journal of Military Service Institution; Cultivator and Country Gentleman; Chemical News; The Microscope; London Garden; The Auk; Science; Architect (British illus.); North American Review; Literary World; Housekeeper; New York Fashion Bazar; Art Journal (with Amer. Supplement); Carpentry and Building; Gardener's Chronicle; Century; Times (London.)

I would call the attention of the Board to the fact that the library seems likely to outgrow the present shelving inside of three years.

Here follows the financial statement for the year:

Inventory, June 30, 1884		$7,046 27
Books purchased from legislative appropriation		500 00
Periodicals of preceding year bound by State Printer		250 00
Books purchased from current expense fund		168 36
Books donated		125 00
Case and cataloguing material		152 72
Seal from the executive department		7 50
Binders for periodicals		5 22
Four picture frames		2 85
Inventory, June 30, 1885		$8,257 92
Expenditures have been as follows:		
Expense from income fund:		
Pay-roll	$549 75	
Books	168 36	
Periodicals	151 40	
Freight, express, stationery, etc	96 03	
		$965 54
Department bills:		
Mechanical	$124 00	
Printing	14 65	
Executive	11 00	
		149 65
		$1,115 19
Appropriation		500 00
Total		$1,615 19

Almost the entire sum charged above to pay-roll, is for work in the catalogues, and might, with entire propriety, be added to the inventory. So, too, the greater part of the bill for freight, express, etc., might properly be considered as so much added to the cost of books. The expense for materials that are consumed in the using, and for work that has left no permanent result, is very slight. Respectfully submitted.

W. H. COWLES, *Librarian.*

COLLEGE, July 1, 1885.

PRINTING DEPARTMENT, 1884–85.

To the Board of Regents — GENTLEMEN: There were enrolled in the Printing Department, during the year, 80 different students. In the Fall Term there were enrolled 45 — 18 ladies and 27 gentlemen; in the Winter Term, 67—16 ladies and 51 gentlemen; in the Spring Term, 26 — 8 ladies and 18 gentlemen.

In July, the printing office was moved from the southwest room of the laboratory, where it had been for four years, to the rooms on the second floor of Mechanics' Hall, vacated by the Domestic Department. This move gave the department a good room — well lighted, and in such shape that the space could be used to good advantage.

The liberal appropriation of $1,500 — or as much of it as was necessary

— by the Board, to add new material to the department, enabled me to fit up a very complete office. A little over $1,400 was expended. The new press purchased is a Babcock country press; and, all things considered, I think it is the best press for the place that could have been purchased. This machine cost, laid down at the depot in Manhattan, $1,050. New body type, and more of it, was substituted for the old; and several fonts of job type, which were much needed, were also purchased. The old press, a half-medium Gordon jobber, was left by the Board with me for disposal. This I traded for a 7x11 old-style Gordon jobber and $75 worth of job type, thus getting in trade $250 for the old press. This was a good trade. The greater variety of the job work done for the College is small in size, and this small, new press, enables me to do it much more rapidly and better than it could be done on the old one.

These additional facilities have enabled me to do better work with my classes than before, and the classes themselves have taken more interest in their work than heretofore. Below is given a list of the principal jobs done during the year:

Second Annual Address before the Webster Society, 300 copies.
Lecture on "Overproduction," by Prof. Walters, in pamphlet form.
A text-book on "Book-Keeping and Commercial Law," by Prof. Nihart, 500 copies.
Constitution and By-Laws of the Manhattan Horticultural Society, 200 copies.
Constitution of Athletic Club, 100 copies.
"Synopsis of Lectures on Political Economy," by President Fairchild, 200 copies.
"Selections for Criticism," for Department of English and History, 200 copies.
"A Brief Outline of English Literature," for Department of English and History, 200 copies.
Annual Catalogue for 1884–85, (51 pages,) 5,000 copies.
Farm Experiments, 1884, 5,000 copies.
Two editions of the *Industrialist*— one in August, 1884, and one in June, 1885— of 10,000 copies each.

The regular edition of the *Industrialist* has been about 1,500.

There were a multitude of small jobs, like letter heads, envelopes, cards, blanks, labels, etc., which required my attention, and at the same time gave advanced students excellent drill in job work.

Besides my regular department work, I have done some committee work assigned me by the Faculty, have taken my regular turn at editorial work on the *Industrialist*, given one chapel lecture, and read a paper at the Farmers' Institute at Winfield, in January.

The following is the financial statement of the Department:

	Dr.	*Cr.*
Inventory, July 1, 1884	$1,779 65	
Cash expenses	3,305 54	
Department bills	95 20	
Inventory, July 1, 1885		$2,921 55
Cash receipts		672 60
Department bills		585 85
Balance		1,000 39
Totals	$5,180 39	$5,180 39

The large balance against the Printing Department is due to several causes. The cost of moving the office, setting up the new press, etc., was a large bill, for which I cannot give myself credit in the inventory. All the machinery and type that were sold could not be sold, of course, at the inventoried price; and so, the difference counts as expense. A better idea of the expenses can be gotten from the following table:

Student labor	$1,135 25
Paper	741 01
Freight, expressage, and drayage	165 12
Press, type, etc	1,162 70
Department bills	95 20
Postage and Industrialist box rent	37 62
Incidentals	63 80

The *Industrialist*, of course, occasions the greatest expense; and the action of the Board in allowing each student in attendance the privilege of sending a copy to some friend, has greatly increased expenses, while it has curtailed subscriptions to some extent. I think, however, that this College paper is the cheapest and best advertising means that can be used, and is more than worth all it costs. The addition of steam power, which has been provided for, next year, will further reduce expenses.

Respectfully submitted. GEO. F. THOMPSON,
COLLEGE, July 1, 1885. *Supt. Printing Dept.*

TELEGRAPH DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: The Telegraph Department enrolled during the past year fifty students—eight ladies and forty-two gentlemen—being a decrease of seventeen, as compared with the year previous.

The following table shows the receipts and expenditures of the Department for the year ending June 30, 1885:

EXPENDITURES.		
Line	$15 12	
Instruments	6 27	
Battery	59 70	
Tools	8 34	
Type writer	10 75	
Students' pay-roll	118 30	
Freight and drayage	15 90	
Refunded fees	5 00	
Telephone rental	40 00	
Bells	15 27	
		$294 65
Department bills	$5 20	
Inventory, July 1, 1885	894 67	
		899 87
Total debits		$1,194 52
CREDITS.		
Cash received for fees	$192 75	
Inventory, July 1, 1885	889 50	
Total credits		1,082 25
Balance—expense		$112 27

The expenditures shown in this exhibit are those incurred in the proper maintenance of the telegraph line, which is now about five miles long, and the direction and location of which is frequently changing, to meet the requirements of the students; the telephone line, connecting offices of the President and Secretary at the College with those of the College Treasurer, Loan Commissioner and Land Agent in the city, one and one-half miles distant, and the electric-bell system, by means of which electric alarms are sounded in each class-room for the control of the movements of the classes.

In accordance with a provision of the Board for assistance in this department, for which my thanks are hereby tendered, one of the more advanced students was given some responsibility in the care of the lines and batteries, and the teaching of classes of beginners. This arrangement has resulted very satisfactorily in more efficient service, both in this department and in the Secretary's office.

The native poles, upon which a large part of the wire is suspended, have passed their limit of usefulness, and should soon be replaced by cedar.

My report as Assistant Secretary of the Board has already been submitted. Respectfully submitted. I. D. GRAHAM,

COLLEGE, July 1, 1885. *Superintendent.*

DOMESTIC DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: The following report for the Department of Domestic Economy is respectfully submitted.

During the past year my work has been somewhat different from that of preceding years, because of the division of the department, when Mrs. Winchip took charge of a portion of the work.

Having been relieved of all care and responsibility in the sewing room, I had time for some classes; and during the fall term I taught a class of fourth-year young ladies in English Literature, a class of first-year students in English, and during the whole year I had a class in rhetorical work.

The literature work was supplementary to that of the spring term preceding. We took up the writings of the authors whose lives had been studied before, and the time was largely spent in becoming familiar with the best works of our most noted writers.

The English class followed the work of previous first-year classes, and was simply a division of the overcrowded class belonging to the Professor of English.

During the winter term the class in Household Economy met for the first time in the new apartments assigned us in the south wing, where plenty of room and many new conveniences made much of the work a pleasure.

Besides the regular work of preparing the Monday dinners for those of the Faculty who wished them, and cooking the regular hours—the products of which were disposed of in the usual Friday lunches—the class prepared tea twice, and lunch once for the Board of Regents, and entertained one evening the committee from the Legislature, doing all the cooking and serving each time.

You remember, perhaps, that I have this class of young ladies two hours per day, lecturing to them one hour and giving them practice in the kitchen laboratory the other. The class is so large it must be divided into three divisions, so I have during this term four full hours besides my rhetorical class.

The spring term gave me my class in Dairying, which did excellent work in butter-making, having as a result 160 pounds of fine butter. The last few weeks of the term were devoted to cheese-making, giving general ideas and some practice in the work.

More close attention and longer time is given to the butter-making, because most of the cheese of our country is to be made in factories, while the butter is, to a large extent, a home product.

The spring term also gave me a class of ladies in Hygiene, and a class of young students in English, in which I gave them drill in reading, as well as some work in general English training.

The following shows a tabular view of classes taught during the year:

Studies.	*Year.*	*No. classes.*
English Literature, (ladies)	Fourth	7
English	First	42
Rhetoricals	First	46
Household Economy	Second	23
Dairying	Second	17
Rhetoricals	First	43
Hygiene, (ladies)	Third	*10
English, preparatory	First	10
Rhetoricals	First	37

* Three of these young ladies passed Hygiene by special examination.

This summary will give some idea of the direction of the expenses of the department:

New equipment of kitchen laboratory and of dairy	$124 20	
Materials for cooking	136 85	
Ice	9 02	
Department bills, (including milk)	116 42	
Decrease in inventory	204 85	
Total		$591 34
CREDIT.		
Lunches and dinners	$106 05	
Butter	32 35	
Department bills	353 00	
		$491 40
Balance, expense		$99 94

The moving from old quarters to new, and the consequent abandonment of some of the old equipment, gives this department an appearance of larger expenditure than heretofore. The inventory shows at present an equipment of $386.75. The kitchen laboratory has furniture amounting to $305.35, while the dairy has $81.40.

Since the very pleasant change in the rooms for this department, and the additional equipment, making the kitchen laboratory indeed a model one for class work, the increased interest shown by the students has been most pleasing, and with all the facilities now within our reach we could not fail to have a pleasant and satisfactory year.

Having some opportunity during the past summer of investigating the work done in this line in other colleges, I have been much gratified to find that, as we were among the very first to inaugurate a successful department of domestic science, so do we hold our rank, and have one of the first places in the list of colleges that do now for young women what has been, for many years, done for young men alone, to give them something practical with which to begin their life-work. I sincerely hope that this department may hold the excellence thus far maintained, and make every year's work profitable in every way to all concerned. NELLIE S. KEDZIE,
COLLEGE, July 1, 1885. *Superintendent.*

MECHANICAL DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: I herewith submit the following report for the Mechanical Department for the year ending June 30, 1885.

Number of students enrolled in the fall term, 135; during the winter term, 120; during the spring term, 85. Enrolled in the blacksmith shop, 12. Whole enrollment for the year, 352.

The course taken in the instruction of students has been to give all students, in their first year in the shop, as much instruction in the care and preparation of all tools used, with the proper methods of dressing out all kinds of stock, and such advanced work in making articles for themselves, if they choose to do so, or on such work as is required for the use of the College. Students who remain through more than one year and elect to learn some wood-working trade are instructed in making such joints and getting out stock in such manner as is most likely to be required in their special trade; all such work being done after detail plans or sketches of the same, so that the connection of the lines with the work may be readily understood.

The financial condition of the department can be seen by the following figures:

DEBITS.		
Inventory of 1884	$2,356 64	
Hardware and other supplies	961 50	
Lumber, doors, sash, etc.	1,313 49	
Labor of students and other employés	1,250 56	
Department bills	26 49	
		$5,908 68
CREDITS.		
Inventory	$2,653 06	
Cash receipts	194 15	
Department receipts	2,510 13	
Bills not audited	30 67	
		$5,388 01
Balance against department		$520 67

The balance against the department has been expended for improvements in the arrangements of the shop, the care and fitting up of tools, repairs and improvement of benches and other appliances for work; replacing of worn-out, broken and lost tools; assistance in the shop; cleaning up and general care of the shop; waste of materials by students in practice hours; and the general expenses of running the department. I think an allowance of about one hundred and fifty dollars will be needed the coming year to keep the supply of tools up to its present standard and add such new ones as may seem desirable. Respectfully submitted.

TIMOTHY T. HAWKES, *Superintendent.*

COLLEGE, July 1, 1885.

SEWING DEPARTMENT, 1884–85.

To the Board of Regents.—GENTLEMEN: The following report of my work in the Sewing Department for the year ending June 30, 1885, is respectfully submitted.

During the fall term I taught five classes in sewing, with an enrollment of 56 young ladies. In the winter term I had 35, and in the spring term 38. Most of the time in the spring term I devoted five hours to the young ladies. During the year, 30 pupils learned cutting and fitting, and we made 103 dresses and over 300 miscellaneous articles, besides many hours spent in the practice of buttonholes and fancy work of various kinds; the young ladies most of the time furnishing their own material for work.

They are first taught plain sewing and the use of the machine; then, as they become more competent, are allowed to cut and plan their own work.

During the year the young ladies have not only learned the mere routine of sewing and how to make various articles, but they have learned to put together and plan various parts of dress and to improve their personal appearance by cultivating taste in all directions and thinking how to make the best of what is within reach; not forgetting beauty while planning towards usefulness in all things, and fitness for every place.

The following will show somewhat the line of expenditure for this department during the past year:

DEBITS.		
Machines	$65 00	
Materials	27 50	
New equipment	17 10	
Department bills (cases of drawers and fittings)	487 55	$597 15
CREDITS.		
Cash	$1 75	
Department bills	8 00	
Inventory	431 85	441 60
Actual expense		$165 55

The expense shown by department bills is large because of the transfer of the Sewing Department from the Domestic Department to the new and commodious rooms prepared for it in the new wing; in consequence of which some of the old equipment was abandoned and much new was purchased.

MRS. ELIDA E. WINCHIP, *Superintendent.*

COLLEGE, July 1, 1885.

MUSIC DEPARTMENT, 1884–85.

To the Board of Regents—GENTLEMEN: I herewith submit a report of the Music Department for the year 1884–85.

In the instrumental department, 61 different students were enrolled—18 young men and 43 young women—28 of this number taking lessons on the piano, 21 on the organ, and 12 on other instruments.

The class of the fall term numbered 36, that of the winter term 35, and that of the spring term 33. About one-half were beginners, and a small percentage of the rest could play fairly well; hence my work is mostly teaching the rudiments.

With the necessarily short allowance of time for practice, very marked improvement is the exception rather than the rule, this being particularly the case with those studying the piano. Enough, however, is accomplished by those having ability and ambition to lay the foundation for excellent players. The course is a thorough one, and, even if not completed during the student's stay here, aids his playing materially. Harmony is also taught. All are expected to take the preparatory course; the study afterwards is optional.

The number enrolled in the vocal classes was 147—97 young men and 50 young women. In each term two classes were taught, one composed of beginners, the other of those somewhat advanced, each class meeting twice a week on alternate days.

The classes of the fall term numbered 107—75 in the elementary and 32 in the advanced class; those of the winter term 86—65 elementary and 21 advanced; and in the spring term 41—21 elementary and 20 advanced.

A thorough knowledge of the elements of music was insisted on, every step being fully explained and made clear before practicing it. Those in the lower class showing sufficient progress could at any time be transferred to the advance class. The progress of both classes was commendable.

During my illness of over a month in the winter term, the classes in vocal music were taken in charge by Prof. Walters.

The College orchestra, numbering 12 pieces, had a drill once a week during the year. The music furnished by it added much to our various exercises.

With the exception of a few pieces, the music during Commencement week was furnished by advanced pupils in instrumental music, the singing classes, and the College orchestra. Respectfully, W. L. Hofer,

College, July 1, 1885. *Professor of Music.*

ANNUAL REPORTS

OF

COLLEGE DEPARTMENTS.

1885-86.

REPORTS.

PRESIDENT'S REPORT, 1885–86.

To the Board of Regents—GENTLEMEN: This report of executive duties and general results of work for the year ending June 30, 1886, is presented with some degree of satisfaction in the growth of classes and general advancement of interest, as well as in the particular work of the departments as reported in detail.

The year opened with a few changes in the working force. Prof. W. H. Cowles retired for further study, and Prof. O. E. Olin was elected to the chair of English and History. Prof. B. F. Nihart was transferred from the Department of Engineering to the charge of the library, and Prof. E. B. Cowgill was called to a new chair including Physics, Mechanics and Engineering. The work in all of these lines has proved energetic and painstaking. Additional help has been secured by the employment of advanced students for a few classes. Mr. F. L. Parker taught in telegraphy, W. E. Whaley in lower English classes, and G. N. Thompson and S. N. Peck acted as assistants in the crowded shop.

The usual provision for backward students of mature years was made, though the proportion of such students has been less than heretofore. The whole number of classes provided for, including industrials, has been, in the fall term 55, winter term 60, spring term 53, besides special students under special direction of professors.

The general discipline has been, as usual, chiefly confined to the routine of attendance and class duty. A single case of breach of good order on Hallowe'en was met by prompt discipline of the students discovered, two of the second year being suspended for a time. The regular Faculty meetings, on Monday afternoons, have been attended by all of the members with the utmost unanimity of interest and action.

The morning exercises in Chapel have been led by Professors Nihart, Lantz, Olin, and myself, in rotation, and the attendance of students has been very regular. Excuses for absence have been promptly rendered, and no general excuse has been asked for.

The total attendance for the year has shown a gratifying increase from 404 to 428.

In this table the first two years are calendar years, while the other eight are school years. This will explain the seeming decrease of students in 1879.

During the twenty-three years of its existence, the College has received 2,818 different students—1,908 young men and 910 young women. Most of these have come from farmers' homes, and after from three months to three years of study, have gone back to such homes without graduation.

The enrollment by classes is shown by the following table:

Classes.	*Gentle-men.*	*Ladies.*	*Total.*
Resident graduates	1	3	4
Fourth year	17	7	24
Third year	23	12	35
Second year	64	27	91
First year	195	78	273
Special course	1	....	1
Total	301	127	428

During the year there have been admitted 233 new students, 92 of whom expressed an intention of taking the full course, 108 a part of the course, and 33 are undecided.

The following table shows the occupations of the parents of the students admitted for the first time during the year:

Farmer and stock raiser	156	Teacher	3	Insurance agent	1
Housekeeper	3	Painter	2	Police judge	1
Merchant	13	Carpenter and mechanic	8	Physician	3
Hatmaker	1	Editor	3	Civil engineer	1
Florist	1	Barber	1	Real estate agent	1
Nurseryman	2	Banker	4	Lawyer	1
County official	4	Miller	5	Book-keeper	1
Hotel keeper	3	Day laborer	2	Laundress	1
Dentist	2	Minister	6	Not given	4
Mason	3				

For native States, the following answers were given:

Arkansas	1	Kentucky	3	Scotland	2
California	2	Michigan	2	Saxony	1
Canada	2	Mississippi	2	Tennessee	2
England	2	Missouri	8	Utah	1
Illinois	33	New York	4	Vermont	3
Indiana	14	North Carolina	2	West Virginia	3
Iowa	18	Ohio	15	Wisconsin	2
Kansas	98	Pennsylvania	13		

By classes, the average age for the past year has been:

Resident graduates	22.39	years.
Fourth-year class	21.19	‘‘
Third-year classs	19.68	‘‘
Second-year class	19.57	‘‘
First-year class	18.48	‘‘

The average age of all students in attendance has advanced in ten years about eight months and five days. There has been an advance in eight of the ten years covered by these statistics, as will be seen by the following table:

Year.	*Age.*	*Year.*	*Age.*
1877	18.12	1882	19.35
1878	18.16	1883	18.81
1879	18.61	1884	19.09
1880	18.80	1885	19.59
1881	18.84	1886	18.98

The following table shows the annual attendance by counties and States for the past ten years:

Kansas counties.	*1877.*	*1878.*	*1879.*	*1880.*	*1881.*	*1882.*	*1883.*	*1884.*	*1885.*	*1886.*	*Total.*
Allen	....	1	1	1	1	....	....	3	....	1	7
Anderson	....	....	....	4	3	2	2	....	....	....	11
Atchison	4	6	4	1	....	3	4	4	3	9	38
Barber	....	....	....	....	....	1	....	....	....	....	1
Barton	....	1	....	2	....	1	4	1	1	3	13
Bourbon	....	....	....	....	1	1	....	2	....	1	5
Brown	1	....	....	1	....	2	6	....	2	14	26
Butler	2	5	6	7	6	2	1	1	1	2	33
Chase	1	....	....	3	6	1	2	5	4	3	25
Chautauqua	....	4	4	1	1	2	3	3	4	....	22
Cherokee	10	18	18	13	10	3	3	3	1	2	81
Clark	....	....	....	....	1	....	....	....	....	....	1
Clay	6	10	3	9	10	18	23	26	26	25	156
Cloud	1	1	....	....	....	1	8	3	6	6	26
Coffey	....	3	3	....	1	1	3	2	2	3	18
Cowley	1	3	3	5	6	4	1	9	7	3	42
Crawford	1	2	2	1	....	....	....	....	2	1	9
Davis	13	5	6	9	9	6	15	16	6	7	91
Decatur	....	....	....	....	....	....	1	1	2	2	6
Dickinson	3	5	3	4	4	3	4	6	5	4	41
Doniphan	....	....	....	....	2	....	1	1	....	....	4
Douglas	....	....	....	1	1	4	....	2	3	3	14
Elk	....	....	....	1	....	1	6	1	4	1	14
Ellsworth	....	2	1	....	2	2	1	1	....	2	11
Finney	....	....	....	....	....	....	....	....	1	....	1
Ford	1	1	1	....	....	....	1	....	....	....	4
Franklin	2	2	....	2	1	4	7	6	6	....	30
Greenwood	3	2	1	7	3	6	2	....	1	1	26
Harper	....	....	....	....	....	....	....	....	....	1	1
Harvey	....	1	1	....	....	....	2	2	1	1	8
Jackson	....	2	2	3	6	6	2	2	1	3	27
Jefferson	3	4	4	6	11	14	2	6	4	7	61
Jewell	2	1	1	2	11	6	10	8	10	7	58
Johnson	3	10	8	11	....	5	2	8	8	5	60
Kingman	....	....	....	....	....	....	....	....	1	2	3
Labette	5	....	1	....	....	3	....	....	1	....	10
Leavenworth	3	....	....	....	2	5	4	1	8	4	27
Lincoln	....	1	2	....	2	....	3	....	....	1	9
Linn	1	....	....	1	....	....	....	1	....	8	11
Lyon	6	7	7	4	5	2	....	3	2	3	39
McPherson	1	3	....	1	2	3	2	5	4	2	23
Marion	....	....	....	1	1	2	1	....	....	....	5
Marshall	3	4	2	4	....	3	5	6	7	5	39
Miami	....	....	....	1	....	....	....	1	1	3	6
Mitchell	1	4	2	2	4	3	4	3	4	....	27
Montgomery	....	4	3	2	....	1	....	2	....	4	16
Morris	....	....	....	3	....	1	1	8	6	3	22
Nemaha	2	6	6	5	1	2	1	4	2	5	34
Neosho	2	1	2	....	....	....	....	....	....	....	5
Ness	....	....	....	....	....	....	....	....	1	....	1
Norton	....	....	....	1	....	....	....	....	1	....	2
Osage	2	1	2	1	....	2	6	6	18	5	43
Osborne	1	1	1	1	2	1	2	7	5	7	28
Ottawa	....	3	3	5	6	5	14	12	12	8	68
Pawnee	....	....	....	....	....	1	....	1	1	....	3
Phillips	3	....	....	1	....	1	1	2	1	1	10
Pottawatomie	13	10	6	8	6	7	12	16	15	11	104
Reno	....	....	....	....	....	....	1	4	2	1	8
Republic	....	1	1	....	....	1	....	2	5	9	19
Rice	2	1	....	....	2	1	....	3	5	5	19
Riley	88	64	65	77	77	90	100	112	99	121	803
Rooks	....	....	....	....	....	....	....	....	1	1	2
Rush	....	....	....	1	1	1	....	....	1	....	4
Russell	1	....	....	....	....	....	....	....	1	1	3
Saline	1	2	2	4	5	3	1	3	5	1	27
Sedgwick	3	1	1	2	2	....	3	2	2	....	16
Shawnee	7	7	8	27	13	16	13	11	12	9	123
Sheridan	....	....	....	....	....	....	....	....	....	1	1
Smith	....	....	1	....	1	....	....	....	1	2	5
Stafford	....	....	....	....	....	1	1	....	1	1	4
Sumner	....	2	2	1	1	2	....	6	1	3	18
Trego	....	....	....	1	2	3	2	3	1	1	13
Wabaunsee	9	10	6	10	20	16	14	17	13	18	133
Washington	....	....	....	1	5	11	2	2	4	4	29
Wilson	....	2	3	2	1	1	....	3	5	7	24
Woodson	....	....	....	....	....	....	....	1	2	1	4
Wyandotte	....	....	....	....	2	1	1	2	....	2	8

ANNUAL ATTENDANCE—CONCLUDED.

State.	*1877.*	*1878.*	*1879.*	*1880.*	*1881.*	*1882.*	*1883.*	*1884.*	*1885.*	*1886.*	*Totals.*
Arizona									1	1	2
Arkansas						3	1			1	5
California									1	1	2
Colorado	2					1	1		1	2	7
England						1		4	3	2	10
Illinois		1	3	2	1	4	1	1	7	10	30
Indiana	1	3			1	1	1	1	1	3	12
Indian Territory									4	4	8
Iowa		1	1	1		1	5	3	3	3	18
Kentucky										2	2
Missouri	3	4	1	5	3	3	4	5	10	10	48
Nebraska	1					2	1	4	3	3	14
New Jersey										1	1
New York	4	2	2	1		1	2		1		13
New Mexico	1			1		4	5	2	1	1	15
Ohio				2	1	1	3	1	1	2	11
Pennsylvania	2	1	1			1	1	2	1	2	11
Utah										1	1
Wyoming		1								1	2
Rhode Island							1	1			2
Wisconsin							1				1
Michigan				1	2	1					4
Massachusetts				2							2
Vermont		1	1								2
West Virginia		1									1
Totals	228	238	207	276	267	312	347	395	401	428	

The graduating class of 1886 numbered twenty-one—fourteen young men and seven young women—all of whom presented four-minute addresses, prepared under my personal direction, and received, by action of the Board, the degree of Bachelor of Science. Their names are as follows:

Lillie B. Bridgman	Atchison, Atchison Co.
Louis P. Brous	Manhattan, Riley Co.
Paul H. Fairchild	Manhattan, Riley Co.
Abbott M. Green	Oberlin, Decatur Co.
James G. Harbord	Agnes City, Lyon Co.
John U. Higinbotham	Manhattan, Riley Co.
Maria C. Hopper	Downs, Osborne Co.
E. Ada Little	Manhattan, Riley Co.
Frank L. Parker	Hutchinson, Reno Co.
Edward H. Perry	Manhattan, Riley Co.
H. Augustus Platt	Manhattan, Riley Co.
Ada H. Quinby	Wakefield, Clay Co.
Ida A. Quinby	Wakefield, Clay Co.
Minnie Reed	St. Clere, Pottawatomie Co.
David G. Robertson	Alton, Osborne Co.
Edward O. Sisson	Newcastle-on-Tyne, England.
John W. VanDeventer	Mankato, Jewell Co.
George W. Waters	Weston, Davis Co.
William E. Whaley	Manhattan, Riley Co.
F. Henrietta Willard	Topeka, Shawnee Co.
John L. Wise	Greenville, Illinois.

The number of graduates up to 1886 is 118. Graduates previous to 1877 pursued, with two exceptions, a classical course, and received the degree of Bachelor of Arts. Since 1877, all have received the degree of Bachelor of Science after a four-years course in the sciences, with good English training.

The seventy-six young men are engaged in business as follows:

Farmers	19
Florist	1
Fruit-growers	2
Mechanics	4
General business men	10
Printer	1
Civil engineers	2
Officer in army	1
Observer in Signal Service	1
Teachers and students of special sciences	8
Teachers in public schools	7
Doctors and students of medicine	4
Dentist	1
Ministers and students of theology	4
Lawyers and students of law	8
Deceased	3

The 42 young women are occupied as follows:

Housewives	17
Teachers	13
Milliners and dressmakers	2
Clerks and type-writers	2
At home	6
Deceased	2

Two graduates of two years' standing, who have pursued courses of study in connection with other work at the College, received, on recommendation of the Faculty, the degree of Master of Science; having presented theses for acceptance, which have since been printed in the *Industrialist.*

The influence of graduates and students is felt throughout the State, and as they reach mature years will be noticeable. Already they are coming to the front in farmers' institutes and horticultural societies, as well as in business circles.

The general work of the year has been gratifying in all respects. The general health of students and Faculty has been excellent, scarcely a case of more than one or two days' illness being reported. An accident at the beginning of the year in the drowning of Frederic C. Shonyo, of Sorghum, Rice county, while bathing, brought a startling sadness into the otherwise happy year; but this death is the only one among the students from any cause during the past seven years of my connection with the College. This record of health is believed to be unparalleled, and can be accounted for only by the healthful location, the inspiriting surroundings, the daily walk to and from College, and the interval of manual training of some kind in each day's routine. A case of homesickness, even, is rare indeed.

The usual provisions for social and literary growth have been made in the weekly exercises either in chapel or in class-room. The members of the fourth-year class have presented before the whole body of students two orations prepared under my own direction, besides the graduating address.

The members of the third-year class appeared at least twice before students and Faculty with declamations, and gave an exhibition at the close of the year — all under direction of Professor Shelton. The other classes were trained in writing and speaking by semi-monthly exercises. It is contemplated to increase the facilities for such training another year by giving more and better opportunities.

The College has been opened once each term for a social gathering of Faculty, students and immediate friends, with a definite programme of exercises provided under charge of the Faculty. These gatherings are confined to the hours between seven and ten in the evening.

The three literary societies have done excellent work throughout the year, weekly reports of their exercises being published in the *Industrialist.* Two of them have given public exhibitions, and two public lectures have been given under their auspices.

The Scientific Club, including both members of the Faculty and students, has held monthly meetings of great interest to the upper class of students, and well attended by others. Their proceedings have been reported from month to month in the *Industrialist.*

The following lectures have been given by members of the Faculty, the attendance of students being required:

Money as Coin, Currency, Capital, and Wealth	Pres. Fairchild.
James Watt and the Steam Engine	Prof. Shelton.
Soap the Gauge of Civilization	Prof. Failyer.
Charles Darwin; Life and Work	Prof. Popenoe.
Physiological Inquiry	Prof. Kellerman.
Wit and Humor of Two Americans	Prof. Nihart.
Charles Lamb	Prof. Lantz.
The Past and Present of Labor	Prof. Walters.
Mobs from a Military Standpoint	Lieut. Nicholson.

Free addresses were given at the invitation of the literary societies by Prof. J. H. Canfield, of Lawrence, and Sam Kimble, Esq., of Manhattan.

The annual meeting of the Kansas Academy of Science was held at the College, and some of the sessions of the State Horticultural Society were also held in the College chapel.

Commencement week was filled by the usual round of exercises, with the addition of a public sale of stock. The annual address was delivered by Hon. T. Dwight Thacher, of Topeka, upon "Science and Productive Industry."

The usual Friday evening prayer-meeting has been continued with a fair attendance, and has been supplemented by the organization of a Young Men's Christian Association and a Young Women's Christian Association, holding weekly meetings. These have had a wholesome influence among the students.

The Farmers' Institutes of the year were held at Minneapolis, Ottawa county; Nortonville, Jefferson county; Pleasanton, Linn county; Lane, Franklin county; and Wakeeney, Trego county. I took part in the one at

Pleasanton, and, after the series was past, assisted the people of Ellsworth in a similar gathering.

My duties at the College have included the usual routine of a daily class, assignment of students to duties, oversight of arrangements for classes, and general responsibility for good order among the students, and regular progress through the year. Oversight of the accounts and financial affairs generally has been the same, though Secretary Graham has looked carefully after details. Correspondence has naturally increased with the growth of the College, but I have so far been able to keep it up essentially with my own hand, since the importance of interests involved is acknowledged.

Outside immediate duties at the College, my labors have included some eight or ten meetings of the State Board of Education, at Topeka, with preparation of questions for State and county examinations. The State Teachers' Association required my attendance and efforts for its success. The meeting of the National Educational Association at Topeka in July, 1886, was secured partially by assistance on my part in the meeting at Saratoga, for which reason my name was placed upon the Executive Committee for Kansas in the preparations for the meeting. May I also here acknowledge my gratitude to the College friends, Faculty and students who have made me a life director of the National Association.

The meeting of delegates from the several Agricultural Colleges at Washington was attended, at your direction, by the President of the Board, Hon. Thomas Henshall, and myself. In that meeting the duties of secretary were given me by the convention.

Other work incidental to the position of President is constantly arising, too multiform for mention. The numerous invitations to lecture or address public gatherings have been uniformly declined, because of more important duties at College. I have given a lecture before the Manhattan Chautauqua Circle, and preached a few times in Manhattan churches. [The usual advertising through the *Industrialist* has been more thorough than usual, and some sixty of the county papers contained advertisements in August.] My classes in Psychology, Logic and Political Economy have numbered about twenty-five students, mostly of the fourth-year class. The instruction, outside of text-books, has included a four-weeks course of lectures in Practical Ethics, and a ten-weeks course in Political Economy, a brief synopsis of which was printed for the class. I also had direction of the Rhetorical drill of the same class through the year. My contributions to the *Industrialist* were limited chiefly to local items, advertising matter, and the Baccalaureate Sermon, preached June 7th, last.

The charge of improvements in buildings during the year has rested largely upon myself, although Prof. Walters has given much time and thought to the plans, and, with Prof. Shelton, supervised the construction of the barn. The plan of the house was essentially my own in all details, and the limits of the appropriation made the utmost study of economy essential. The result has justified the attention, in that the house is generally satisfactory to all concerned.

The following statement of expenditures and receipts of the Department may give a clearer view of the interests under control:

Offices:		
Postage	$234 55	
Stationery	32 35	
Furniture	184 30	
Labor	120 00	
		$571 20
Care of buildings, etc.:		
Wages of janitor	$600 00	
Wages of students	737 45	
Fuel	3,035 74	
Lights	139 10	
Implements	55 41	
		4,567 70
Buildings:		
Repairs	$804 84	
Improvement	6,662 33	
		7,467 70
Engine at Mechanics' Hall		1,351 33
Grounds:		
Care	$69 75	
Improvements	6,333 33	
		6,403 08
General College:		
Furniture	$1,565 33	
Incidental	275 33	
Expenses, conventions	233 20	
Expenses, State Board of Education	70 29	
Expenses, museum expedition	248 75	
Rent for gardener	120 00	
Advertising	432 85	
Carriage, Board	70 50	
Farmers' Institutes	237 20	
College pictures	34 05	
Catalogues, 5,000	221 90	
Diplomas, 100	78 60	
Industrialist, 30,000	191 32	
		3,779 32
Total		$24,139 80

The following statement of receipts diminishes somewhat the total:

Rent of dwellings	$164 00
Sale of fuel	161 77
Sale of boarding hall	1,000 00
Labor on appropriations	119 03
Sale of sundries	4 72
	$1,449 52

The inventory of the Executive Department, which includes grounds, buildings, and general furniture, but not apparatus or stock, is $143,923.65.

In conclusion, I must express for my associates a respect and affection quickened by their earnest endeavors to second all my labors with equal, if not superior efficiency. I also thank the Board for their faithful exertions and their uniform kindness toward me.

Respectfully submitted. G. T. FAIRCHILD, *President.*

COLLEGE, July 30, 1886.

FARM DEPARTMENT, 1885–86.

To the Board of Regents of the Kansas State Agricultural College — GENTLEMEN: I respectfully submit the following outline, my thirteenth annual report of work done in the Farm Department during the College year ending June 30, 1886. Appended to this is a report on the College barns and one on the special experimental work of the department, embracing the following subjects:

Cooked and raw corn as food for fattening pigs.
Corn meal and corn-and-cob meal for beef-making.
Pork from the pasture field.
Our tame grasses; facts and opinions.
Thick seeding, subsoiling and manuring for corn.
Warm drinking-water for milch cows.

These added documents have been published by the College Printing Department in a neat pamphlet of fifty-six pages, of which an edition of 5,000 copies has been given to the public.

My class-room work is stated by terms as follows:

Fall Term—Agriculture, a class of 15 young men of the fourth year; farming (industrial), 23 young men, mostly of the third-year class.

Winter Term—Agriculture, a class of 54 young men of the second year.

Spring Term—U. S. Constitution, the fourth-year class, numbering 24 students.

As during a number of previous years, I have had charge of the third-year class in Rhetorical drill and practice throughout the year.

Since the spring of 1878, my name has appeared in each issue of the *Industrialist* as managing editor of this our College weekly. While the labors attaching to this office are much less than might be supposed from analogies furnished from the general field of journalism, they are still considerable, involving (1) a weekly scanning of our exchanges, some 250 in number, and the choosing of selected matter; and (2) generally the writing of all local matter; although in this I have received generous aid from President Fairchild. For various reasons, chiefly demands upon my time from the farm and elsewhere, I desire to be relieved from the labor and responsibility of this work during the coming year.

I have been present and taken part in four of the five Farmers' Institutes in which the Faculty has been represented during the year. In addition, I had a share in the work of an institute held at Fulton, Missouri, at the request of Prof. Sanborn, Secretary of the Missouri State Board of Agriculture. Of these Kansas institutes, I only wish to say here that every year shows an increasing interest in them, by the farmers of the State, as certainly each year gives added success and importance to the work.

I am indebted to the Board for the privilege of attending the Sixth Annual Meeting of the National Association of Teachers of Agriculture and Horticulture, held at Purdue University, Lafayette, Indiana, June 29th and 30th. This meeting was a successful one, and very helpful to all those in attendance. Something of the range of thought taken in the discussions of the Association will be gathered from the following list of subjects, which with others were considered:

"How can the teachers of Horticulture and Agriculture best excite the interest and enlist the sympathies of the farmers of their respective States?"

"What should be embraced in a course of practical Agriculture, and how can this course be arranged so as to meet the wants of those who desire to pursue it for a short time?"

"How much manual labor or practice should be required of Agricultural students?"

"What are among the most essential means of illustration in teaching Agriculture and Horticulture?"

"What are the chief hindrances to successful teaching?"

Ample opportunity was given for a thorough examination of the excellent practical and experimental work now being done at Purdue, under the direction of W. C. Latta, the professor in charge.

Various other duties not heretofore classified have brought a considerable share of work and responsibility. As secretary of the Kansas State Short-horn Breeders' Association I have had the chief care and responsibility of the programme and business arrangement of the meetings of the society. As a member of the Executive Committee of the Society for the Promotion of Agricultural Science, the publication of the proceedings of the society has been in my charge. In this last, however, efficient assistance has been given me by Supt. Thompson.

The experimental work has been referred to elsewhere. Of all the work done in my department, it is at least doubtful if any brings as quick a return as this in popular appreciation. In the past year the cost of our experimental work has been paid out of the general College fund. In view of the public character of this work, I suggest that the State Legislature be asked to meet the cost of our future experimental undertakings.

About $500 will be required to meet the expenses of experiments planned for the coming year.

THE FARM.

The agricultural season covered by this report has been a reasonably successful one. All the grain crops, except wheat, yielded largely and were profitable to the College. The hay crops, too, were very good; our mixed orchard-grass and clover excelling, both in quantity and quality of hay yielded. The winter of 1885–86, however, has been a damaging one to all crops wintering in the ground. Our wheat crop of some eighteen acres has been totally destroyed, and the same fate has overtaken our clover and orchard-grass meadows, some 30 acres in extent. Our loss through the action of last winter's frosts alone would not be covered by $500.

The recent purchase by the Board of forty-four acres additional land for the use of the farm, while a welcome and much-needed increase to the field of farm operations, is yet likely to add much to the rough work of the farm for some years, without being of very direct value. About 32 acres of this new purchase was, when secured by the Board, in the condition of raw prairie, for the most part unfenced. Since, it has been mostly inclosed by a good wire fence, and subdivided almost entirely into convenient fields. About 14 acres of this new purchase have been broken the present season.

BUILDING.—A detailed description of the new experimental barn is given in the accompanying documents. Quite recent plans for important additions to the system of barns have been made, and contracts for the work let. These proposed additions consist of an experimental piggery 24x48, and a cattle shed 15x44 feet, interior measure in both cases. The experimental piggery has ten pens, with room for grain storage and feed cooker, and having a loft for the storage of bedding. The lower story of the cattle shed opens completely to the barn-yard on the south. The walls of both buildings are of stone.

STOCK.—The general health of the College herd has been excellent, and losses from disease have been next to nothing. The only exception to the general rule of healthfulness has been the case of a considerable number of young pigs, which died from a disease similar to that known among farmers as the thumps.

Under the instructions of the Board in February, I visited the famous herd of Shorthorn cattle owned by James T. Davidson, of Balsam, Ontario. While there I purchased for the College the year-old Shorthorn bull Highland Chieftain, bred by Amos Cruickshank, Sittyton, Scotland, at a cost of $600. This animal Mr. Davidson pronounced "one of the best, if not the best, Shorthorn bull that he had ever imported." The animal was shipped to the College in charge of an experienced attendant, and reached a point one hundred miles from the College in safety. While in process of transhipment at this point the animal met with an accident, breaking the right hind leg. From the nature of the injury—a compound fracture of the femur—recovery was doubtful from the first. All efforts at mending the broken limb, carried on through eight weeks, proving unavailing, the animal was finally dispatched. This was a very great loss to the Farm Department in several ways; in one way the loss is shown in my financial statement, given at the conclusion of this report.

A public sale of stock, the property of the College, and a draft from the Shorthorn herd of Messrs. Bill & Burnham, was made at the College barn on the afternoon of June 8th, the day before Commencement. The attendance was very large, the feeling excellent, and the bidding often spirited. The eight Shorthorn cows and heifers sold by the College brought an average price of $134.37; the seven yearling bulls averaged $117.14, and the four Jersey cows sold brought an average price of $96.25. These prices, while not large, must, all things considered, be taken as satisfactory. It is interesting to note in this connection the total expenses of the sale to the College were $123.53, this amount being a small fraction over five per cent. (.0518) of the total receipts of the sale. The experiment of this sale has satisfied me that all of the College surplus stock should be disposed of in this open, public manner.

Under the head of live stock, it seems appropriate to mention our little experiment with carp culture, which has been referred to in previous reports. During the past two years these fish have multiplied very slowly, owing to the depredations of their natural enemies, crawfish, mink, and turtles, which it was found impossible to exclude from the ponds, owing in part to their proximity to a neighboring stream. During the year these depredations have succeeded in destroying every one of the finny residents of our carp ponds.

MACHINERY.—A considerable amount of valuable machinery has been added to the appliances of the farm by purchase and donation since my last report was made. In every case where machinery has been purchased manufacturers have seen their way clear to give the College a liberal discount from list prices. The following, with the exception of a few small tools, like hoes, spades and rakes, is a complete list of our additions in this line:

Steamer and feed cooker, manufactured by H. A. Williams, Louisburg, Kas.; Belle City feed cutter, manufactured by Belle City Manufacturing Co., Racine, Wisconsin; Bullock scales, manufactured by the Howe Scale Co., Rutland, Vt.; the Centennial fanning mill, manufactured by Freeman & Son, Racine, Wisconsin; Boeis' self-supplying hog watering trough, Goodwin & Bishop, Delphos, Kas.; Douglas' curved crank pump, manufactured by W. & B. Douglas, Middleton, Conn.

I hope to report upon the special qualities, good and bad, of these machines in the course of my next statement of experimental work.

NEEDS OF THE DEPARTMENT.— Very much of what may be called the standard equipment of the farm has been so long in service that it may safely be said to have outlived its usefulness. For example, one of the farm teams has been in the service of the College constantly since 1873. The two wagons in use, again, were both purchased in 1873. Our plows, harrows, cultivators and harness have a similar record of long and faithful service. Partly from this natural course of waste and decay, and in a great measure on account of the recent considerable increase in the area of the farm, provision should be made for additions to the equipment of the farm at an early day, as follows: One team of horses or mules; one wagon, broad tire; one cultivator, two-horse; one set double harness.

We have long felt the need of a farm house convenient to the barn. The house now in use by the foreman and his assistants, besides being an inconvenient structure, is located about 100 rods from the barn, thus obliging weary men to waste time and strength in a long walk to and from work and each meal. Moreover, the great value and importance of the interest clustering about the system of barns makes it imperative, as it seems to me, that the farm house be located within easy reach of the barn. I suggest, therefore, that an appropriation of say $1,500 be secured, if possible, for the erection of a farm house at a point north of the barn.

Certain other needed improvements demand your attention. No provisions have yet been made for flooring and partitioning the new experimental piggery. The old barnyard fence, also, which was taken down to give room for the experimental barn and cattle shed, must certainly be replaced within the next three months.

FINANCIAL STATEMENT.

To valuation June 30, 1885, including buildings	$18,287 43	
To vouchers approved	8,534 04	
By valuation June 30, 1886, including buildings		$22,528 75
By amount received from stock, produce and labor		3,539 87
By amount expended in experiments, not inventoried		465 34
By amount expended in improvement of grounds, not inventoried		75 00
By balance		212 51
	$26,821 47	$26,821 47

Respectfully submitted.
COLLEGE, June 30, 1886.

E. M. SHELTON,
Professor of Agriculture.

CHEMICAL DEPARTMENT, 1885–86.

To the Board of Regents—GENTLEMEN: I have the honor to make the following report for the year ending June 30, 1886.

There were in my department during the Fall Term, two classes daily in inorganic chemistry; three classes per week in chemical manipulation. Winter Term, one class in agricultural chemistry; two classes one-half term in organic chemistry; two classes one-half term in mineralogy; three classes one-half term in determinative mineralogy. Spring Term: Three hours daily in chemical analysis; one special student.

As in the past, Mr. J. T. Willard has ably assisted in the general work of the department, such as preparing work for the classes. He has had charge of one of the work classes, and has had an equal part in the work of the others. I trust that his efficiency will be appreciated by the Board.

I have had my share in the general duties of the Faculty, such as lectures, *Industrialist* work, and rhetoricals. Of the last, I have had one of the three divisions of the second-year class throughout the year.

During the year there have been important changes in the Chemical Department. I have been relieved from teaching the classes in physics and meteorology, and from taking the meteorological observations. I have, however, kept a record of the rainfall since March 1st, using a rain guage $\frac{1}{5000}$ of an acre in area.

The appropriation made by the last Legislature, for heating and necessary ventilation of the chemical laboratory, has been judiciously expended. In addition to the appliances for warming the building, steam drying-closets, water ovens and sand baths have been provided, as have also a large condenser and a block-tin-lined tank for distilled water. The lecture room and all of the work rooms have been supplied with proper ventilating hoods. In most cases, the old stove flues serve to carry off the gases from these. Most of the hoods have just been put in place, and you are requested to examine them.

The laboratory needs one thing to make the ventilation perfect: ventilators in the roof over the main portion of the building. I recommend ventilators after the general plan of those in the wing constituting the qualitative laboratories.

It is now ten years since the Chemical building was erected, and the roof and ceilings, never very good, are reaching that stage when they should be renewed. If this is done, I think it desirable to build the walls of the central portion of the building several feet higher. This will improve the appearance of the structure very much.

I earnestly ask your attention to this whole matter in time to bring it before the next session of the Legislature, otherwise all must be postponed two years.

I have, during the year, on two separate occasions, asked appropriations for experimental work, understanding one year ago that you were so adjusting the work of the departments as to make this possible. Such appropriation was not made. In the absence of a response to my request, I have felt justified in dropping the matter, further than to say that I am ready at any time to take up such work.

It is important that the mineralogical museum should contain both the usual massive varieties and the crystalline ones, as well as the various colors which they take. While our collections represent, in kind, the more common mineral species, they are really deficient in good crystallized specimens; such as will give the student a knowledge of the characteristic forms of the minerals. Some of the species are well represented in these crystalline forms, but most are not. I think we cannot do better than to purchase from some dealer who has a large stock to select from, a good representative collection. In this way there need be no unnecessary duplication of specimens, and we can get a collection perfect, in itself, so far as it goes. The cost will, of course, vary with the size and brilliancy of the specimens.

I recommend that one thousand dollars be expended in procuring such minerals as I have indicated.

I append the yearly balance sheet:

BALANCE SHEET, CHEMICAL DEPARTMENT, 1885-86.

	Dr.	*Cr.*
To inventory, June 30, 1885	$6,015 00	
Appropriation for steam heating	1,500 00	
Chemical apparatus	340 27	
Chemicals	107 19	
Freight and expressage	40 95	
Gasoline	11 33	
Physical apparatus	85 90	
Minerals	33 17	
Student labor	42 50	
Miscellaneous	7 10	
Department bills	57 65	
Credit by cash	....	$16 55
Fees from students (paid to Secretary)	....	168 00
Department bills	....	2,187 85
Inventory, June 30, 1886	....	5,647 85
Balance	....	220 81
Totals	$8,241 06	$8,241 06

Respectfully submitted.

GEO. H. FAILYER,
Professor Chemistry and Mineralogy.

COLLEGE, July 1, 1886.

HORTICULTURAL DEPARTMENT, 1885–86.

To the Honorable Board of Regents, Kansas State Agricultural College— GENTLEMEN: I have the honor to submit herewith a report upon the work done in the Department of Horticulture and Entomology, and as Superintendent of the grounds, orchards, and gardens, for the year ending June 30, 1886.

CLASSES.

The classes in my charge during the several terms of the past year may be arranged as follows:

Class.	*Males.*	*Females*	*Total.*
FALL TERM.			
Horticulture	53	26	79
Rhetoricals	19	12	31
Industrial horticulture, third year	22	....	22
WINTER TERM.			
Rhetoricals	18	10	28
Greenhouse work, industrial	....	1	1
SPRING TERM.			
Entomology	44	19	63
Rhetoricals	16	11	27
Industrial horticulture, second year	42	....	42

In addition to the above classes of my department, I was placed in charge, during the winter term, of a class in geography, composed of 37 young men and 13 young women—50 in all—making the total enrollment in classes in my charge 251 males, 92 females, a grand total of 343 students. I shall not dwell upon methods and scope of instruction, as these have been much the same as described in previous reports, modified as suggested by experience and as demanded by the increased size of the classes.

THE GROUNDS.

As appears below in the classification of the expenditures of the year, the grounds have demanded a largely-increased proportion of the outlay of the department.

The extension of the plantations towards the completion of the accepted plan for the grounds; the increased care demanded for the elaboration of general or special effect; the call for frequent pruning, thinning or replanting, or for additions to groups already established, show this year, as they will doubtless show for some years to come, with the proper growth of the grounds, increased expenditure of the appropriations, and of the time and working force of the department in this direction.

Additions to the number of 140 sorts were made, by purchase and by gift, to the list of varieties of trees, shrubs and plants now on trial here, the greater part coming from the well-known nurseries of Thomas Meehan, of Philadelphia, to whom thanks are due for a number of choice sorts presented. Of the accessions, the greater number were planted in nursery rows, for further growth or for special culture, the remainder being placed in permanent positions on the lawn.

Of the small trees received one and two years ago, and since cultivated in the nursery, several hundred were this spring planted upon the grounds, the most considerable plantings being made along the east line, south of the main entrance, along the east half of the south line, to the left of the College building, and in the belt at the rear of the buildings. Other planting was done about the dwellings and along the drives where needed.

The grounds about the newly-constructed dwelling for the President were graded and seeded to grass, the necessary drives and walks made, and some sodding done at the margins of the walks and upon the sloping grounds. The severity of the winter, shown by the killing out of the grass in large patches on the lawn, and especially about the College building and chemical laboratory, made necessary the reseeding or sodding of these places.

Other losses, due to the severe storms in the latter part of the winter, are shown by the vacancies occurring in the nursery at the east of the College building, where the trial lots of ornamental trees and shrubs, the Russian and Polish apples and pears, and other novelties were growing. Of some sorts, all the trees not protected by drifted snow were destroyed entirely; others, and so of most of those injured, were simply killed to the ground. The most peculiar injury was that in case of certain pears, apples, plums, and cherries, the roots of which were found, on digging in the spring for transplanting, to be completely dead, while the tops were sound and bright. These losses, while considerable, still leave a large collection, and one of of much interest to horticultural visitors.

THE ORCHARD.

The chief improvement in the orchard has been the thinning of the plantations to the north and east of Horticultural Hall. The trees in north orchard, originally planted twenty feet apart each way, are now, at the age of about sixteen years, in parts of the orchard much crowded. As a last resort, the removal of the alternate trees in each row was decided upon, and the work done in the most crowded portions. In the south orchard the trees were originally planted much closer in the rows, and here the need of thinning was much greater, though on account of the smaller size of the trees, and the inferior varieties removed, the immediate loss was less. In either orchard, however, the final result can but be that of a profit.

Nursery trees of such varieties of pear, plum, cherry and apple as survived last winter, from the purchases of two and three years ago, were this spring planted in orchard, in the space north of the President's dwelling. In this planting is included one or two trees each, of about forty varieties of pears, ten of cherries, ten of plums, and twenty of apples, these including such of the Russian and Polish fruits, purchased from Prof. Budd, of Iowa, as were large enough to transplant.

Several thousands of peach seedlings were budded in the fall, with the then large number of sorts growing in the peach orchard. Of these buds, about 1,200 survived the winter, and will make salable trees the coming spring. The parent trees, with but two or three exceptions, were destroyed, or so badly injured as to be worthless, by the winter.

THE GREENHOUSE.

The greenhouse has continued to be a most useful adjunct in supplying information to the students in botany, and material for their use, as well as in the propagation of plants for the ornamentation of the grounds. The expense has, for the past year, been limited practically to the care of the house, as no important purchases were made, while the receipts, though meager, are as large as could be expected with no effort made to supply the quantity and kind of plants demanded by the public, the policy having been to first of all employ the greenhouse for purposes germane to College work, and dispose of only what marketable surplus products there might be. A small appropriation is needed for the purchase of additional varieties of plants representative of prominent exotic families.

THE MUSEUM.

The entomological museum has received important accessions through the purchase, from a student, of about 1,200 specimens, and the collection in Kansas and Colorado of about 10,000 specimens by myself and temporary assistants. The numerous duplicates will furnish means for adding largely by exchange to the list of species contained in the collection. A displayed collection, illustrating economic entomology, showing injurious and beneficial insects in their various stages, and in connection with their work, has been commenced, and so far fills twelve large boxes in the floor case belonging to the department. This work is capable of almost indefinite extension, and requires time in the completion of series of forms of even the commonest insects. This collection will be increased as rapidly as opportunities permit, and will finally be of great interest and value. I should acknowledge here the interest of students and friends of the College, as shown in the gift of many rare and valuable specimens of insects for our collection. Specimens of wood growth under various conditions have been collected as opportunity offered, and a series of these neatly cut and dressed is ready for display as soon as space can be had. A choice collection of the woods of Florida was purchased from Mr. A. H. Curtiss, formerly Government collector in that State. These were polished, and are placed in one of the wall cases.

In addition to the duties pertaining to the office of Superintendent of the department, I have had the customary share of the general work as a member of the Faculty, have acted as Secretary of the Kansas Academy of Science, and as Botanist to the State Board of Agriculture.

With your approval, I shall submit for publication, as an appendix to this report, a list of the accessions to the experimental plantings since the publication of the list of two years ago, with notes upon the results of the trials, so far as warranted at the present time.

FINANCIAL STATEMENT.

DEBITS.		
Pay-roll	$1,897 26	
Other cash expenditures	668 48	
Department bills	108 35	
Inventory, 1885	7,590 36	
		$10,264 45
CREDITS.		
Cash receipts	$319 50	
Department bills	87 95	
Inventory, 1886	8,160 33	
		8,567 78
Expenses for the year		$1,696 67

The following statement shows the direction of the cash outlay of the department for the year:

Grounds, including stock purchased, care of same, and planting	$1,318 82
Orchards and garden	594 88
Greenhouse, including stock purchased, and care	285 67
Tools	113 52
Museum, specimens purchased and work done	131 31
Office expense	9 05
Current expense for repairs and supplies	112 49
Total	$2,565 74

Respectfully submitted. E. A. POPENOE,

Prof. Hort. and Entomology, and Supt. of Orchard, Grounds and Gardens.

COLLEGE, July 1, 1886.

DEPARTMENT OF BOTANY AND ZOÖLOGY, 1885–86.

To the Board of Regents—GENTLEMEN: The several branches taught in this department during the past year, as well as the numbers of students in each branch, are shown in the following table:

FALL TERM.	
Physiology	27
Special Zoölogy	1
Special Botany	1
Rhetoricals	20
Industrial	1

WINTER TERM.	
Zoölogy	24
Structural Botany	26
Special Botany	1
Rhetoricals	31
Industrials	2

SPRING TERM.	
Elementary Botany	108
Geology	26
Special Botany	1
Special Zoölogy	1
Rhetoricals	24
Industrial	2

Besides the class-work, I have performed the usual duties connected with the *Industrialist* and Farmers' Institutes.

In consequence of not having museum jars, I have not been able to display the zoölogical collections made by the Scientific Expedition last summer. The botanical material, then collected, I have worked up; and this adds several hundred specimens to our herbarium and many more to our duplicates for exchange.

The other important additions to the collections are a set of fresh-water shells purchased of Professor Popenoe; seventy-eight fishes in alcohol presented by Dr. David S. Jordan, President of the Indiana State University; and some anatomical preparations in alcohol, made by special students in the department.

The expenses of the department are shown in the following table:

Class-room supplies	$41 90
Instruments, tools, etc	110 95
Museum specimens	28 15
Freight and drayage	12 87
Student labor	22 85
Department transfers (printing, postage, etc.)	8 15
Total	$224 87

Respectfully submitted.
W. A. KELLERMAN,
Professor of Botany and Zoölogy.
COLLEGE, July 1, 1886.

DEPARTMENT OF MATHEMATICS, 1885–86.

To the Board of Regents—GENTLEMEN: I take pleasure in submitting to you my report of the Department of Mathematics for the College year ending June 30, 1886.

The following is a statement of the classes taught in the various terms:

Studies.	*Enrolled....*	*Examined...*	*Pass'd......*
FALL TERM.			
Algebra (two divisions)	73	66	57
Arithmetic (two divisions)	107	86	60
WINTER TERM.			
Geometry (two divisions)	61	56	54
Grammar	61	47	46
United States History	50	48	43
SPRING TERM.			
Algebra (three divisions)	110	100	81
Geometry (two divisions, five weeks each)	49	49	46

A small division of the first-year class in Rhetorical exercises (elocution and composition) was under my charge during the year.

A satisfactory degree of progress over the work of preceding years can be reported. This was largely owing to the greater preparation of those applying for admission to our classes.

In an industrial institution it is obvious that much of the instruction in mathematics should be in the direction of their applications to the practical affairs of life; yet it is necessary that sufficient of the pure mathematics be taught:

1st. To give familiarity with the various forms and methods of reading.

2d. To furnish training in the oral and written expression of such methods.

3d. To enable the student to comprehend the formulas used by the mechanic, the engineer, and others in their works.

Our course of study has been wisely planned to accomplish these objects, and at the same time to furnish to the pupil all the available and practical knowledge possible in so short a course.

It has been my constant aim in conducting this department to so adjust the work as not, in searching for that which is merely *practical*, to lose sight of the importance of thorough training in the various process of reasoning.

The advisability of extending the scope of our work in mathematics has been discussed. Conic Sections, Analytical and Descriptive Geometry, are studies in a direct line with the general tendency of our work, and a knowledge of them is almost essential to complete success in any field of engineering. These ought to be a part of our course of study, but their addition would be at the expense of some other department of work. In view of the great necessity for the work now being done by the College in its general field, it will be sufficient at present to provide for these branches in connection with post-graduate and special courses in Engineering, Architecture, and Drafting.

D. E. Lantz,
Professor of Mathematics.

College, July 1, 1886.

MILITARY DEPARTMENT, 1885–86.

To the Board of Regents—GENTLEMEN: I have the honor to submit my report as Professor of Military Science and Tactics for the year ending June 30, 1886.

The work in this department is of two kinds—drill and class instruction. The students enrolled in the drill class have been instructed in the school of the soldier, company, skirmish drill, bayonet exercise, and the school of the battalion. In all these exercises the progress has been very satisfactory.

In the class instruction the young men of the second-year class have been required to attend lectures, two a week, during the last half of the fall and first half of the winter terms. These lectures were designed to give a general idea of the organization and duties of the army and a slight appreciation of strategy and general tactics as exemplified in some of the more important campaigns of the Rebellion.

The numbers enrolled during the year are as follows: Fall term, 90; winter term, 60; spring term, 65.

I am, very respectfully, your obedient servant,

W. J. NICHOLSON, First Lieut. Seventh Cavalry,
COLLEGE, July 1, 1886. *Professor Military Science and Tactics*

DEPARTMENT OF INDUSTRIAL ART AND DESIGNING, 1885–86.

To the Board of Regents—GENTLEMEN: I have the honor to submit the following report of the Department of Industrial Art and Designing.

During the school year 1885–86, I have taught classes as shown in this schedule:

TERMS.	FREEHAND.		MECHANICAL.				TOTAL.
	First year.	*Advanced.*	*First year.*	*Second year.*	*Third year.*	*Advanced.*	
Fall	....	10	161	....	....	9	180
Winter	159	9	5	....	....	8	181
Spring	28	8	....	46	23*	6	113
Totals	187	27	166	46	23	23	474

*These classes met on alternate days.

For methods of instruction followed and text-books used, I refer you to my last report. The work done by the different classes has been very satisfactory. The drawings, numbering upwards of two thousand, were on exhibition in my class-room during Commencement week, and were undoubtedly seen by you. The collection was arranged to show the course of instruction followed, and contained from five to twenty plates from each pupil.

Permit me to mention some auxiliary work done during the year, directly or indirectly to the interest of the College. In the summer and fall I superintended the construction of the new experimental barn; in the winter I attended the Farmers' Institute at Pleasanton, the State Teachers' Association at Topeka, the session of the State Horticultural Society at Manhattan, and the meeting of the Kansas Academy of Science held at the same place; in the spring I drew a picture of the College grounds for the annual catalogue, and three illustrations of the barn for the report of the experimental work of the Farm Department. I also prepared plans and specifications for the piggery, with cattle-shed attached, and for the remodeling of Armory Hall. This, together with the preparation of a weekly column in the *Industrialist*, of Kansas educational notes, has made the year a busy one.

Through the kindness of the Board, the department has added to its equipments during the year a fine set of models, representing the Five Orders of architecture and the Roman-Cross Vault; also inside blinds for the class room, several tools, and a number of drawing-boards.

The most imperative need of the department is a large, well-lighted room for advanced students, especially those in topographical and engineering drawing of the third year of the course, where large maps, plans and scientific diagrams might be left on the work-tables undisturbed until finished. As may be judged from the above schedule, there is hardly room enough at present for the regular classes. It would not be very expensive to furnish the attic of the central part of the main building for this purpose, and I am certain that it would add greatly to the convenience and effectiveness of the department if means could be found to do this before another year. The furniture necessary to equip this room could perhaps be obtained for about $200.

The department is also in need of additional shelving for models and other illustrative material. A cabinet with from fifty to two hundred drawers should also be provided, to give the students a chance to store away their triangles, compasses, pens, pencils, sketches, etc. There are at present but sixteen drawers available for this purpose — or one drawer for every twelve or more students — while every member of the department ought to have a separate drawer assigned to him.

Respectfully submitted. J. D. WALTERS,
Professor of Industrial Art and Designing.

COLLEGE, July 1, 1886.

LIBRARY, 1885–86.

To the Board of Regents—GENTLEMEN: I have the honor to present the following report as Librarian and Instructor in Bookkeeping for the year ending June 30, 1886.

During the year a large part of my time was given to the completion of the catalogue. The work has been considerable, and the care with which it has been done is shown by the catalogue itself. Corrections in the catalogue should be made as mistakes are discovered, and additions as books are received. The convenience and help of the catalogue substantiate the wisdom of making it, notwithstanding the time and expense incurred.

The Library is in good condition. Especial pains have been taken during the year to rebind all books that were torn or mutilated in any way. The crowded condition of the agricultural and horticultural departments of the library makes it necessary to find room elsewhere for some of the books belonging to those departments. The time is not far distant when a larger room will be required.

The number of books drawn during the year by students is 4,049, classified as follows:

Fiction	850	Physics	44
Poetry	343	Mathematics	50
Biography and Travels	487	Botany	10
History	493	Horticulture	43
Essays	302	Agriculture	112
Miscellaneous	680	Physiology and Anatomy	96
Reports	37	Biology	25
Mental Science	93	Geology	38
Domestic	30	Entomology	9
Theology	43	Chemistry	29
Political Economy	94	General Science	92
Art	49		

The increase in the number of books has been, since the last report, as follows:

By purchase	356	By exchange	16
By binding	136	Total	591
By donation	83		

There are in the library 6,156 volumes, classified as follows:

Fiction	185	Political Economy	57
Poetry	126	Art	126
Biography and Travels	510	Mathematics and Engineering	126
History	252	Horticulture	103
Essays and Addresses	180	Agriculture	466
Reports	1,266	Magazines	413
Mental Science	56	General Science	528
Domestic Science	26	Miscellaneous	1,098
Theology	518		

The list of periodicals upon our reading-table may be found below. Care has been taken to preserve all leading magazines for binding, and the papers in the reading-room have been brought within reach of the pupils, so far as possible:

Harper's Bazar.
Musical World.
Scientific American and Supplement.
Nature.
Education.
The Nation.
Eclectic Engineering Magazine.
Rural New Yorker.
Journal, Royal Agricultural Society.
American Naturalist.
Gardeners' Monthly.
Manufacturer and Builder.
Chemical Society's Journal.
Electrical Review.
American Agriculturist.
Penman's Art Journal.
Household.
London Quarterly Journal of Microscopical Science.
Eclectic Magazine.
Harper's Weekly.
Atlantic Monthly.
Delineator.
Popular Science Monthly.
American Journal of Science and Arts.
Magazine of American History.
Harper's Monthly.
Journal, Military Service Institution.
Cultivator and Country Gentlemen.
Chemical News.
London Garden.
The Auk.
Science.
Architect.
North American Review.
Literary World.
Housekeeper.
The Seasons.
Art Journal, (with American Supplement.)
Carpentry and Building.
Gardeners' Chronicle.
The Century.
London Times.
Canadian Entomologist.
Journal of Science, (English).
Meteorological Journal.
Journal of Comparative Medicine.
The Critic.
American Architect.
Entomologica Americana.
Botanical Gazette.
Journal, American Chemical Society.

My class-room work has been as follows: During the fall term, I had a class in first-year arithmetic, consisting of 34 gentlemen and 20 ladies; a class in grammar, with 35 gentlemen and 25 ladies, and a class in writing, with 34 gentlemen and 19 ladies. During the winter term, three classes in bookkeeping, numbering 35 ladies and 77 gentlemen, and a class in writing with 30 gentlemen and 9 ladies. During the spring term, a class in arithmetic, with 26 gentlemen and 20 ladies, a class in bookkeeping, with 19 gentlemen and 5 ladies, and two classes in writing, with 50 gentlemen and 21 ladies.

The following is a list of newspapers on file, most of which are received in exchange for the *Industrialist:*

DAILIES.

Topeka Capital.
Topeka Commonwealth.
Leavenworth Times.
Leavenworth Standard.

WEEKLIES.

Humboldt Union.
Republican Plaindealer.
Atchison Champion.
Atchison Globe.
Atchison Patriot.
Hazleton Express.
Brown County World.
El Dorado Republican.
Douglass Tribune.
Augusta News.
Chase County Courant.
Sedan Times-Journal.
Baxter Springs News.
Clay Center Dispatch.
Wakefield Advertiser.
Clay Center Times.
Concordia Republican-Empire.
Kansas Blade, Concordia.
Clyde Herald.
Cloud County Kansan, Jamestown.
Glasco Sun.
Burlington Republican-Patriot.

Winfield Courier.
Winfield Tribune.
Arkansas City Traveler.
Burden Enterprise.
Girard Press.
McCune Times.
Junction City Union.
Junction City Tribune.
Junction City Republican.
Oberlin Eye.
Abilene Gazette.
Solomon Sentinel.
Carleton Advocate.
Abilene Chronicle.
Lawrence Tribune.
Kinsley Graphic.
Howard Courant.
Howard Democrat.
Moline Mercury.
Hays City Times.
Wilson Echo.
Ellsworth Democrat.
Globe Live-Stock Journal.
Speareville Blade.
New West.
Ottawa Journal.
Wellsville News.
Milbrook Times.
Fremont Weekly Star.
Graham County Democrat.
Eureka Herald.
South Kansas Journal.
Fall River Times.
Surprise Post.
Harper Sentinel.
Newton Republican.
Halstead Independent.
Kansas Cultivator.
Holton Weekly Recorder.
Holton Signal.
Osawkie Times.
Oskaloosa Sickle.
Valley Falls New Era.
Jewell County Monitor.
Jewell County Republican.
Burr Oak Herald.
Salem Argus.
Randall Register.
Jewell County Review.
Jewell County Democrat.
Kansas Patron, Olathe.
Kearney County Advocate.
Kingman Leader.
Oswego Independent.
Labette County Democrat.
Parsons Palladium.
The Catholic, Leavenworth.
Lincoln Beacon.
LaCygne Weekly Journal.
Pleasanton Observer.
McPherson County Republican.
McPherson Freeman.
Smoky Valley News.
Canton Carrier.
Peabody Gazette.
Peabody Graphic.
Florence Weekly News.
Marshall County News.
Marshall County Democrat.
Waterville Telegraph.
Blue Rapids Times.
Paola Times.
Beloit Courier.
Public Record, Cawker City.
South Kansas Tribune.
Council Grove Republican.
Council Grove Guard.
Seneca Tribune.
Nemaha County Republican.
Centralia Journal.
Chanute Times.
Thayer Headlight.
Norton Courier.
The Champion.
Norton Democrat.
Almena Star.
Common People.
Burlingame Independent.
Astonisher and Paralyzer, Carbondale.
Osborne County Farmer.
Osborne County News.
Downs Times.
Minneapolis Messenger.
Delphos Carrier.
Kirwin Chief.
Phillipsburg Herald.
Kansas Reporter, Wamego.
Louisville Republican.
Kansas Agriculturist, Wamego.
Wamego Democrat.
Republican Citizen, Atwood.
Hutchinson News.
Scandia Journal.
Sterling Gazette.
Sterling Bulletin.
Lyons Republican.
Manhattan Nationalist.
Manhattan Republic.
Manhattan Mercury.
Leonardville Monitor.
Randolph Echo.
Russell Record.
Western Live-Stock Journal.
Salina Herald.
Saline County Journal.
Salina Republican.
Wichita Eagle.
Weekly Nation.
Kansas Farmer.
Kansas Methodist.
Kansas Newspaper Union.
North Topeka Mail.
Weekly Capital and Farmers' Journal.
Kansas Law Journal.
Western Baptist.
Gaylord Herald.
Reamsville Dispatch.
South Haven New Era.

Sumner County Standard.
Caldwell Journal.
Oklahoma War-Chief.
Geuda Springs Herald.
Oxford Register.
Wellington Republican.
Western Kansas World.
Eskridge Star.
Washington Republican.
Washington County Register.
Washington Weekly Post.
Hanover Democrat.
Clifton Review.
Haddam City Clipper.
Barnes Enterprise.
Wyandotte Gazette.
Colman's Rural World, St. Louis, Mo.
Kansas City Live-Stock Journal.
Farmers Budget, Sterling, Ill.
Farmers Review, Chicago.
Southern Live-Stock Journal, Starkville, Miss.
Kansas City Live-Stock Record.
New York Independent.
Church Union, New York.
Christian Cynosure, Chicago.
Educational News, Philadelphia.
National Republican, Washington, D. C.
Prairie Farmer, Chicago.
New England Farmer, Boston.
Home Weekly, Xenia, Ohio.
Husbandman, Elmira, N. Y.
Our Country Home, Greenfield, Mass.
Sentinel, Ionia, Mich.
Southern Cultivator and Dixie Farmer.
Western Agriculturist, Quincy, Ill.
The Citizen, Boston.
American Garden.
Western School Journal, Topeka.
Western Friend.
Breeders' Gazette, Chicago.
Oberlin Review, (bi-weekly,) Oberlin, O.

DONATIONS.

Publication.	*By whom.*
Smithsonian Report, 1883	Government.
War of the Rebellion, Vol. XII	Government.
Laws of the United States	Government.
Tenth Census, United States, Vol. II	Government.
A Journey through Kansas	Prof. W. H. Cowles.
House Journal, 1884–5	Government.
Senate Journal, 1884–5	Government.
American Entomological Society, Transactions, Vol. X	Robert Manning.
Acts of the Anti-Slavery Apostles	Parker Pillsbury.
Michigan State Board of Agriculture, Report of	H. G. Reynolds.
Report Chief Signal Officer, 1884	Government.
Official Record, War of Rebellion, Vols. 13 and 14	Government.
Geological Survey of Minnesota, 1872–82	Prof. Winchell.
Congressional Record, 16 volumes	Government.
Ontario Reports of Agriculture and Arts	—
Pennsylvania Agricultural Society, Vols. 7 and 8	—
Tennessee State Board of Health, 1880–84	—
U. S. Coast and Geodetic Survey, 1884	Government.
Transactions American Horticultural Society, Vol. 3	—
Tenth Census, Vol. 13	Government.
Report Kansas Railroad Commission, 1885	Commission.
Report Comptroller of Currency, 1885	Government.
Report Commissioner of Education, 1883–4	Government.
Report Chief of Ordnance, 1885	Government.
Lady of the Lake	Prof. B. F. Nihart.
Elements of Analytical Mechanics	Government.
Statistics Department of Agriculture	Government.
The Law of Success	W. S. Speer.
Farm Statistics of Michigan	Prof. Shelton.
Table of Geographic Positions	Government.
U. S. Commissioners of Fish and Fisheries, 4 volumes	Government.
Report of Education, Mich., 6 volumes.	State Superintendent.
Report of Education, Illinois, 1883–4	State Superintendent.
Report of Education, Iowa, 1883-5	State Superintendent.
A Political Crime	—
Michigan State Board of Health, 1884	—
Michigan Agricultural Society, 1885.	H. G. Reynolds.
Directory of Dickinson County, Kansas	W. Knaus.
Directory of Saline County, Kansas	W. Knaus.
Proceedings National Teachers' Association	Pres. Fairchild.
Report Chief Engineer U. S. Army, 4 volumes	Government.
U. S. Census Report, Vol. 14	Government.
Smithsonian Report, 1884	Government.
Birds of Kansas, 1886	N. S. Goss.
Report Secretary of Treasury, Vols. 1 and 2	Government.
Report Superintendent Schools of Arkansas	State Superintendent.
War of the Rebellion, Vol. 15	Government.

The financial statement for the year is as follows:

DEBIT.		
To inventory, June 30, 1885	$8,756 92	
Students' pay roll	536 85	
Cash paid for books	745 31	
Cash paid for periodicals	165 30	
Freight, express, stationery, etc	50 10	
Department bills	60 00	
CREDIT.		
By inventory, June 30, 1886		$10,399 03
Cash		7 41
Balance	91 96	
	$10,406 44	$10,406 44

Respectfully submitted.
B. F. NIHART,
COLLEGE, July 1, 1886.
Librarian, and Instructor in Bookkeeping.

TELEGRAPH DEPARTMENT, 1885–86.

To the Board of Regents—GENTLEMEN: The enrollment of students for the year ending June 30, 1886, in this department, numbers 54; of this number, 6 were young ladies and 48 young gentlemen. This is an increase of four over the enrollment for last year.

The receipts and expenditures of the department for the year are shown in the following table:

EXPENDITURES.		
Student labor	$139 55	
Type-writer supplies	2 45	
Battery supplies	32 06	
Freight and drayage	8 23	
Tools, tacks, nails, etc	3 90	
Telephone rental	40 00	
Refunded fees	5 50	
Line material	33 68	
Bells	3 35	
Instrument and office wire	8 00	
Department bills	6 75	
Inventory, June 30, 1885	889 50	
		$1,172 97
CREDITS.		
By cash received as fees	$213 00	
Department bills	73 80	
Inventory, June 30, 1886	974 85	
		1,261 65
Balance		$88 68

The new cedar poles provided for at the January meeting of the Board have been received and put in place, thereby adding materially to the stability and efficiency of the line.

The department has no wants to present at this meeting.

My other duties as an officer of the College may be briefly mentioned as follows:

As Assistant Secretary of the Board it has been my duty to keep the books and accounts here named:

A *Voucher Record*, in which all bills rendered against the several departments of the College are entered, with the proper dates, number, and name of payee. This account is verified by cross-additions every month, and closed into the *monthly accounts* of the receipts and expenditures of the income fund, the several appropriations from the State for buildings or improvements, and the data of reports from the several officers of the College and the State Treasurer.

Land Sales book, containing a record of the date, purchaser and terms of sale for each quarter-section of land sold; also memoranda of contracts, showing payments due each month, and the date of patenting on final payment.

Land Ledger, showing a distinct account with each sale contract, including each payment of interest and principal shown by triplicate receipts from State Treasurer.

Bond Ledger, in which in a series of books is shown a complete record of each bond with coupons, and of each payment shown by triplicate receipts of the State Treasurer.

Accounts with State Treasurer, showing date, number and amount of each triplicate receipt, classified as a source of income or kind of investment reduced; also date, number and amount of each warrant against either fund, and disbursements made and securities deposited. After verification with the monthly report of the State Treasurer, this account is closed monthly and results carried to the *monthly balances*, which preserve the exact condition of all funds and offices at the close of each month, and a transcript of which is published each month in the *Industrialist*.

Inventory of all property of the College in itemized detail, revised and re-copied at the close of each fiscal year.

Department transfers, showing exchanges of value in work or materials between departments. This account is balanced at the close of each year, and closed into the department accounts.

As Secretary of the Faculty, I keep a full record of all transactions of the Faculty, and records of the course of each student from date of entrance to close.

As chairman of the standing committee of the Faculty on examinations and grades, I have had charge with other members of the committee, of all entrance examinations and examinations for special grades, and as a member of the committee on museums it has been my privilege to add to the College collections about 200 specimens of Kansas fishes of my own collecting, and 78 named species of Mississippi valley fishes given me by Mr. Carl H. Eigenmann, of the State University of Indiana.

I have attended and read papers before two of the series of five Farmers' Institutes participated in by the College, during the past winter.

Incidentally I may mention the following facts: I delivered a lecture, by invitation, before the "Chautauqua Literary and Scientific Circle," of Wabaunsee, in September. I have held the office of Secretary of the Manhattan Horticultural Society, which meets monthly at the College, during the year, as also the office of Treasurer of the Kansas Academy of Science and the chairmanship of its section on Ichthyology.

Respectfully submitted. I. D. GRAHAM,
Secretary, and Superintendent of Telegraphy.

COLLEGE, July 1, 1886.

DEPARTMENT OF MECHANICS, PHYSICS AND ENGINEERING, 1885–86.

To the Board of Regents — GENTLEMEN: During the year I have given instruction in the following branches now included in the Department of Mechanics, Physics and Engineering, viz.: Trigonometry and Surveying, Physics, Meteorology, Mechanics, and Civil Engineering; and in addition taught a class in Rhetoricals during the year, and two classes in Arithmetic during the winter term.

SCHEDULE OF CLASSES.

Studies.		*Males.*	*Females*	*Total.*
FALL TERM.				
Trigonometry and Surveying	Third-year class	18	9	27
Physics and Meteorology	Fourth-year class	18	9	27
Rhetoricals	First-year class	19	17	36
WINTER TERM.				
Mechanics	Third-year class	19	8	27
Arithmetic — two classes	First-year class	71	28	99
Rhetoricals	First-year class	24	18	42
SPRING TERM.				
Physics	Third-year class	19	6	25
Civil Engineering	Third-year class	17	....	17
Rhetoricals	First-year class	21	16	37

The class-work in trigonometry consisted in demonstrations of the principles of the science by the students, and the application of these principles by the aid of logarithms to the solution of practical problems.

The class-room work in surveying was devoted to a study of the instruments used, of the plan and markings of the U. S. Government surveys, of the U. S. Survey field-notes, and to methods of measurement and computation. During the entire term the class was divided into several squads for field practice. A map of the College farm was made by each member of the class during the winter term, from surveys made during the fall term.

The class in physics and meteorology considered subjects of heat and electricity during the first nine weeks of the fall term. These subjects were illustrated by numerous experiments, and the more recent developments were presented by lectures. The last five weeks of the term were devoted by the class to the study of meteorology.

The subject of mechanics is a difficult one for our students, being preceded in our course by barely enough mathematics to render them capable of grasping the analysis of the subjects of force and motion. I cannot refrain from commending the zeal and energy with which the class pursued the study of these important problems.

During the spring term the third-year class began the study of physics. The subjects of sound and heat were considered, and the subject of light was entered upon. The principles, as discussed in the text, were illustrated by numerous experiments and explained by lectures.

Civil engineering was studied by the young men of the third-year class during the spring term. In addition to a study of the text, they learned in the field some of the practical methods of taking levels for railroads, canals, etc., and of running railroad curves. Each member of this class prepared a thesis, illustrated by drawings, on some engineering subject selected by himself. Some of these papers are worthy to be ranked as professional papers, being able discussions containing much original thought.

During a portion of the year a number of the fourth-year class pursued advanced studies in electricity, but in such a way as to require but little attention from me.

The classes in arithmetic during the winter term, and the class in rhetoricals during the entire year, were considerable additions to the regular work of the department.

The other work of the year consisted in taking the meteorological observations three times a day, in regular contributions to the *Industrialist*, in determining the true meridian by observation of the north star and a determination of the magnetic variation, and in observations of the meteoric showers of November.

The recent advances in some branches of the science of physics have been very great, and the apparatus of the department will require considerable additions to enable us to properly illustrate subjects of great and growing practical importance. This department ought also to meet the demands of our graduates and others, who desire here to take advanced studies in physics.

There is original work which this department ought to do to contribute to the solution of problems of practical and theoretical importance, but which can scarcely be entered upon with our present equipment.

In view of these facts, your attention is invited to the accompanying list of apparatus, which is needed to properly meet these demands.

In removing the department into its permanent rooms, it is desirable that it be provided with such apparatus, cases and lecture and work-tables as will not need changing, but may receive additions as required by future growth. In this department it is important that each student have an unobstructed view of the lecture table, in order that he may witness the experiments. To make this possible, it is necessary that the rear seats be elevated. Most experiments in light can be made in a dark room only, and many of the finest experiments in electricity also require a dark room. To secure this during class hours, solid shutters for the windows of the recitation room are required.

Our shelter for the meteorological instruments is not such as is recommended by the chief signal officer. Recent investigations have led that officer to publish plans and specifications for such shelters to insure greater accuracy in the indications of these instruments. Your attention is invited to the above considerations, in the hope that provision may be made for the immediate wants of the department.

FINANCIAL STATEMENT.

TRANSFER AND INVENTORY.	Dr.	
Transfer from Chemical Department	$1,178 40	
Inventory as received from B. F. Nihart	590 00	$1,768 40
DEPARTMENT BILLS.		
Making apparatus and repairs, Mechanical Department	$21 30	
Stationery and postage	7 30	28 60
EXPENDITURES.		
Students' work removing and cleaning apparatus	$11 60	
Type-writing	1 05	
Compiling and copying meteorological records, 11 years	94 15	
New apparatus, repairs, and supplies	30 85	137 65
		$1,934 65
	Cr.	
Inventory	$1,809 00	
Department bills	2 60	1,811 60
Balance		$123 05

Very respectfully, E. B. Cowgill,
Instructor in Mechanics, Physics and Engineering.

College, July 1, 1886.

DEPARTMENT OF ENGLISH AND HISTORY, 1885–86.

To the Board of Regents — Gentlemen: I respectfully submit the following report of work in my department for the year ending June 30, 1886.

The general plan of the work of last year has been continued, with no material change. The text-books, with one exception, have remained the same.

Fall Term.— During this term I instructed four classes, three in Grammar and one in General History; the classes in English being from the first year, and the class in History from the third. There were one hundred and sixty students enrolled in English, and thirty-one in History.

The work in grammar includes analysis of the English sentence, together with enough technical grammar to form a basis for composition and rhetoric.

The work in history comprises a study of the genesis and growth of nations of the earth, the causes of strength or weakness, and the struggles of people towards and up to stable government, and the arts and sciences of highly-civilized life. Emphasis is given to the unity of history, and its progressive tendency.

WINTER TERM.—During the winter term I instructed five classes daily: three in English Structure, one in Rhetoric, and one in United States History. The work in English structure comprises a study of the origin and growth of the English language, the changes to which it has been subject, together with the history and derivation of many of its words. The classes are drilled in the formation of derivatives from the Saxon, Latin, and Greek elements in the language, attention being given to all modifications in meaning. In this way, words come to have a full and accurate meaning, and synonyms are readily distinguished. The lessons close with lectures on historical English.

The third-year class in rhetoric has for its work the study and discussion of the principles of rhetoric as drawn from the most appropriate and effective expressions of thought in the various departments of composition. It involves many references to the best writers and speakers, and a knowledge of how they used the elements of rhetoric. The object is to give students some basis for higher composition and argument, and furnish general standards by which to test the correctness of their own work.

The work in history was an effort to lead the class along the path of our country's development—political, territorial, social, and industrial. There were two classes in United States history, but as my time was fully occupied, one class was placed in the hands of a professor in another department. My classes this term averaged about forty-five members.

SPRING TERM.—Four classes were placed under my instruction this term—one in English Literature, two in Composition and Elements of Rhetoric, and one in Grammar—a "B" class.

In English literature I asked the Faculty to substitute for the "Cyclopedia of Literature" a book that would be more convenient as a class text-book in the limited course that we can take. This was done, and we have used "Kellogg's English Literature" as a text-book, while we have studied many of the standard authors through cheap but carefully-prepared selections from their writings. The object has been to introduce them to actual literature, rather than to what books say of literature, and so to foster a taste for good productions that they will always be readers.

In addition to these classes, I had throughout the year a class in Rhetoricals from the second-year class.

I may say that in my department I observed, in most cases, careful, earnest work, that brought with it a very fair degree of success.

O. E. OLIN,
COLLEGE, July 1, 1886. *Instructor in English and History.*

PRINTING DEPARTMENT, 1885-86.

To the Board of Regents—GENTLEMEN: Herewith I have the honor to submit a report of the operations of the Printing Department for the year ending June 30, 1886.

Following is a tabular statement of the number of students taking printing as an industrial during the three terms of the year:

Term.	*Ladies.*	*Gentlemen.*	*Total.*
Fall term	8	32	40
Winter term	8	44	52
Spring term	3	21	24
Total for the year	19	97	116

The number of different names appearing on my grade-book was seventy. The progress made by these young people has been very satisfactory to me. The quite thorough equipment of the office enables me now to give students that line of work which I think the department ought to teach; and new machinery which has already been ordered by the Board will enable me to do still better work next year.

I must commend the action of the Board in putting in steam power and steam heat in Mechanics' Hall. Besides being a matter of economy, the engine gives that steadiness of power so desirable in operating any machine. The steam heat has proved very efficient; during the coldest weather of winter it was an easy matter to keep the building comfortably warm. This could not be said when stoves were used for heating.

The amount of work done in my department this year has been large. The job press has been kept busy printing such things as letter heads, envelopes, circulars, cards, book labels, herbarium labels, programmes, labels for greenhouse and for museum, blanks for use in the offices of the President and Secretary, checks for library, etc.

The cylinder press has not been idle. Besides the regular editions of the *Industrialist*, averaging about 1,500 copies, 10,000 copies were printed in August and also in June, for advertising purposes; the annual catalogue, 44 pages, three illustrations, 5,000 copies, has just been issued; farm experiments, 56 pages, 5,000 copies, has occupied our attention during the past month; during the winter we printed 800 copies of the proceedings of the Society for the Promotion of Agricultural Science—a pamphlet of 59 pages; also a text-book, by Professor Failyer and Mr. Willard, to be used by the classes in chemical analysis, 500 copies, 100 pages; each of the three literary societies printed 500 copies of its constitution.

It may be seen by anyone who will take the trouble to examine the book of specimens, which I have prepared for exhibition at Topeka during the meeting of the National Educational Association in July, that our line of work is more varied than that pursued in the majority of offices in the State. It is very desirable that those young people who intend to follow the business of printing should have some knowledge of such a variety of work, and I find that those who know most about such work secure positions without difficulty, and are paid good wages.

I deem it an item worth mentioning in this report, that this department, following the general policy of the institution, is managed with the idea of economy and best results always in view. My classes are not allowed to be wasteful in type, paper, ink, or soap, or anything of the kind. All paper that is fit for scratch-paper is preserved for that purpose, and is used to good advantage in the Secretary's office; all small strips of paper such as usually go to waste in other printing offices, are here made into the very handiest of scratch-books, and use is found in the several departments for all that can be made. This practice not only saves several dollars, but it serves to teach students the lesson that a dollar saved is better than a dollar earned.

Below is given in tabular form the financial statement:

DEBITS.		
To inventory, June 30, 1885	$2,921 55	
Student labor	826 55	
Paper supplies	845 04	
Freight and expressage	59 50	
Type, etc	9 98	
Postage and box rent of Industrialist	29 73	
Incidentals	45 30	
Department bills	21 05	
		$4,758 70
CREDITS.		
By inventory, June 30, 1886	$3,229 63	
Cash	408 40	
Department bills	567 16	
Balance	553 51	
		4,758 70

GEO. F. THOMPSON, *Superintendent of Printing.*

COLLEGE, July 1, 1886.

DEPARTMENT OF DOMESTIC ECONOMY, 1885–86.

To the Board of Regents—GENTLEMEN: I have the honor to submit the following report of work done in the Department of Domestic Economy during the year ending June 30, 1886.

In the fall term, as you are aware, I have my class of fourth-year girls in English Literature. There were seven members of this class, and we spent a pleasant and profitable time in reading many of the works of standard authors. Essays were written on differences found in style, comparisons were made, growth noted, and changes remarked all the way, beginning with Chaucer and following the best of our written language down to Carlyle, Emerson, and Holmes.

During that term I also taught a class of preparatory students in Arithmetic, and had a first-year class in Rhetoricals.

The extra oversight of the young ladies, in the way of excusing absences, etc., which was given me this year, took some time, and made the fall term full of work.

During the winter term the class in Household Economy numbered 22, and during the twelve weeks the young ladies, besides the taking of the daily lectures, did a large amount of cooking. They had their regular work in preparing the Monday Faculty dinner and the Friday students' lunch, with which you are somewhat familiar through former reports; and in addition during the year they have prepared the food, arranged for and carried through two banquets and one evening party, besides the teas and lunches of which the Regents have personal knowledge.

The spring term gave me a preparatory class in English, in which a large part of the work was drill in reading, and my regular classes in Hygiene and Dairying. In hygiene I had eight young ladies of the third-year class who went with me through ten weeks of lectures on many of the requisites for the having and keeping of health.

In dairying, a class of 20 second-year girls took the lectures on milk, butter, cheese, and the best ways of producing, caring for and using them. The class made, during the term, 158 pounds of good butter, and spent a few hours with cheese curds and cottage cheese.

The following summary will show somewhat the direction of expenditures during the year:

New equipment	$34 40	
Materials for cooking	151 30	
Ice	8 25	
Milk (from Farm Department)	66 33	
Paper	2 95	
Repairs on utensils	1 75	$264 98
Received cash (lunches and dinners)	$116 80	
Butter (158 pounds)	33 50	
Increase of inventory	34 40	184 70
Balance		$80 28

My class in Rhetoricals continued a part of the work during the entire year. It numbered 51 in all, and met once in two weeks. Each member was required during the year to prepare nine recitations and write eight essays on topics assigned by the teacher.

During the winter I attended two of the Farmers' Institutes held in western counties. I found this very pleasant work, as every one where we went seemed glad to hear all that could be told of our work, and were especially interested in what is being done here for and by the young ladies.

The year as a whole has, in this department, been very satisfactory in every way. The work done by students has seemed better than ever before; and as the accommodations for the department have increased, its usefulness has grown greater, and it comes each year nearer to carrying out in perfection all the plans made for the year's work.

Respectfully submitted. MRS. NELLIE S. KEDZIE,
Instructor in Household Economy and Hygiene.
COLLEGE, July 1, 1886.

MECHANICAL DEPARTMENT, 1885–86.

To the Board of Regents — GENTLEMEN: I herewith submit the following report of the Mechanical Department for the year ending June 30, 1886.

The whole enrollment of students for the year has been 401. The number of individual students enrolled has been 240. The divisions for each term have been as follows: Fall term, 150 carpenters, 8 blacksmiths; winter term, 141 carpenters, 9 blacksmiths; spring term, 92 carpenters, 1 blacksmith. The course taken has been as in former years, to give the greatest amount of practice with the least waste of materials, and to a large extent students have been allowed to work on articles for themselves, paying for all materials used. So that the larger part of work done by students has been taken to their homes, but wherever the work could be turned to account, on work for the College, it has been so directed.

The financial condition of the department is as follows:

BILLS AGAINST THE DEPARTMENT.

Amount paid for labor of students and others	$1,157 52
Amount paid for lumber, etc	640 80
Amount paid for hardware and supplies	1,764 28
Amount of department bills	11 10
Inventory of 1885	2,653 05
Total	$6,226 75

BILLS IN FAVOR OF THE DEPARTMENT.

Receipts for department bills	$2,155 44
Receipts of cash	680 77
Inventory of 1886	2,605 15
Total	$5,441 36
Balance	$785 39

The balance against the department has been expended for assistance in shop, in class work, for sharpening tools, repairing fixtures, &c., cleaning up shop, care of lumber, wear, loss and breakage of tools, and the general running expenses of the shop, with loss and waste of materials by students in practice hours.

Respectfully submitted. T. T. HAWKES, *Superintendent of Shops.*
COLLEGE, July 1, 1886.

SEWING DEPARTMENT, 1885–86.

To the Board of Regents—GENTLEMEN: Herewith I respectfully submit to you my report of the Sewing Department for the year ending June 30, 1886.

The progress made by the young ladies in this department during the past year is very encouraging.

In the graduating class all the young ladies made the dresses in which they appeared on commencement day. The same is true of those who took part in the undergraduates' exhibition. I am happy to note a very marked interest taken by all the pupils in their work in this department, and many manifest much skill and good taste in cutting and fitting and in planning their work to make the most of the materials at hand.

There has been an increase in the number of pupils in this department in the last year: Fall term, 54; winter, 46; spring, 70.

During the year we made over 650 articles, of which 150 were dresses. Many hours were spent besides in learning to use the needle and sewing machine. About thirty of the young ladies learned to cut and fit dresses.

During commencement week we made an exhibit of the young ladies' work, in our rooms at the College. In that exhibit, as well as the one prepared for the National Teachers' Association at Topeka in July, we tried to show the kinds of work that the young ladies have been employed at during the last year. So much, however, of the work is made for their immediate use, that we cannot have very much to exhibit at any one time.

The following will show somewhat the line of expenditure in this department in the last year.

DEBIT.		
Machines	$31 80	
Materials	20 85	
New cases and racks	47 10	
Paper	3 25	
		$103 00
CREDIT.		
Cash	$7 25	
Inventory increase	88 10	
		95 35
Balance		$7 65

Respectfully submitted. MRS. ELIDA E. WINCHIP,
COLLEGE, July 1, 1886. *Superintendent of Sewing.*

MUSIC DEPARTMENT, 1885–86.

To the Board of Regents: I here submit the following report of the Musical Department for the year ending June 30, 1886.

The total enrollment in the instrumental department was 50, distributed as follows: Piano, 27; organ, 20; and other instruments, 3. During the fall term the class numbered 37; in the winter term, 30; and in the spring term 20.

The course on the piano is a complete one, consisting of drill in instruction book, and studies by Kohler, Duvernoy, Loeschorn, Czerny, Cramer, Kullak, Bach, etc., with suitable pieces. The organ course consists of instruction book and some of the above studies, and pieces.

In harmony, I use a short course of my own, which enables the student to understand thoroughly the different intervals, formation of scales, major and minor, the common chords and dominant sevenths. This completed, Emery's Harmony is taken up if the student wishes to study the subject further.

The singing classes have had the usual drill during the year; each class, elementary and advanced, meeting twice a week. The enrollment in these classes was 106; 61 in the elementary, and 45 in the advanced class. The College orchestra has also been kept up, meeting once a week. It numbered 12 pieces.

During the Commencement exercises, the music was furnished by the students in the various music classes, and the orchestra.

Respectfully submitted. W. L. HOFER,

COLLEGE, July 1, 1886. *Professor of Music.*

APPENDICES.

FARM EXPERIMENTS

AT THE KANSAS STATE AGRICULTURAL COLLEGE—1884.

CORN MEAL AND CORN-AND-COB MEAL FOR FATTENING STEERS.

The question of the value of cobs as cattle food, when ground with the corn which grew on them, is one about which farmers are by no means agreed. The writer, when attending meetings of stock-raisers, has been struck by the earnestness with which both sides of this question have been championed. In those parts of the East where the high values of cattle feed compel the practice of close economy in feeding, the quite common practice of feeding the cobs, ground with or without the grain, has the sanction of long experience. Even in the West, the large and increasing number of the various patterns of corn crushers in use indicate a corresponding increase in the practice of feeding corn and cob.

It is interesting here in the outset to notice the chemical composition of corn and cobs and other food stuffs with which they are likely to be compared:

	Water......	*Ash.........*	*Albuminoids......*	*Fibre.......*	*Nitrogen—free extract....*	*Fat..........*
Corn—western yellow	13.93	1.25	8.82	1.59	70.48	3.92
Corn cob—Kansas dent	9.25	1.16	1.91	31.22	55.86	.60
Oat straw	12.50	1.81	2.30	55.96	26.42	1.00
Hay—timothy and blue-grass	14.3	4.70	7.00	26.90	45.40	1.70

The analysis of corn cob was made by Mr. J. T. Willard, Assistant in the Department of Chemistry of this College. The analyses of corn and oat straw were made by Prof. W. O. Atwater, and that of hay by Prof. S. W. Johnson, and are taken from the report of the Connecticut Board of Agriculture for 1879. While these figures show a considerable nutritive value to the cob, it must be said of them, as of the results of the analyses of food stuffs in general, that they are only suggestively valuable. The actual value of the various stock foods is an agricultural question that can only be determined by actual experiment.

The object sought in the experiment detailed below was the value of cobs when fed, ground with the corn grown upon them, to fattening steers. It was to be expected that, incidentally, some useful facts bearing on the cost in feed of producing a given weight of gain, the gain per steer, the total feed, and related matters, would be shown by the experiment.

In the autumn of 1883, ten steers were purchased for use in this experiment. These animals were selected by myself, with the sole object of securing animals that resembled each other in age, weight and feeding character. They were, with one exception, two-year-olds of the previous summer; the exception being steer No. 9, which was fully six months older than his fellows. The lot were undoubted range "scrubs" of the most pronounced character. Not one of them had ever been in a barn or shed, or known shelter other than that furnished by the lee side of a bluff or the scant timber growing along prairie streams. Nevertheless, the lot was admirably suited to my purpose in this experiment. They were very uniform in weight, as a reference to the first horizontal column in table No. 1 will show, and they were as uniform in size and apparent disposition to fatten as in weight. Moreover, the lot having been raised together by the same man, under precisely the same conditions, brought to the work a similarity in appetites and tastes which especially adapted them to the requirements of the experiment.

The steers were tied up December 3d, in a plain battened board shed which had been prepared especially for them. Each animal was given a space four feet in width, with ample alley room at the rear. From December 3d to December 19th the steers were gradually introduced to the full feed which was to follow. During this time, a small but gradually increasing ration of grain was fed, with a diminishing feed of hay. In the outset this difficulty in the management of the experiment was seen: the steers must have a daily feed of hay or other coarse fodder, and if this ration was varied to meet the wants of the different steers, the results of the experiment might be attributed as much to the variable quantity of the fodder as to the difference in the quality of the grain fed. To obviate this difficulty, the steers were fed as before stated, during this probationary period a quantity of fodder which was regularly reduced until the average minimum amount required by all was reached. During the entire progress of the experiment the practice was to feed a uniform ration of fodder that was not so large but that it would be wholly consumed by each steer. This amount was found to vary from eight to ten pounds daily. The quality of this fodder varied from oat straw to a fair quality of mixed orchard-grass and clover hay. The regimen here provided — the maximum quantity of grain with the minimum amount of fodder — is strongly supported by the practice of feeders in this section of Kansas, who agree with practical unanimity in feeding the least amount of hay or other fodder possible, many going so far as to feed no fodder whatever during the time of fattening. The best possible justification of the course pursued in this experiment is furnished by the fact, conclusively shown in the tables which follow, that the steers made a continuous and rapid gain during the entire time in which they were fed.

Steers Nos. 1, 2, 3, 4 and 5 were fed, with the exception of fodder, exclusively upon meal made by grinding the whole ears of corn, including cob; Nos. 6, 7, 8, 9 and 10 were fed, exclusive of fodder, corn chop made from shelled corn. All were fed twice daily with all possible regularity at 8 A. M. and 5 P. M., and all were watered once daily a short time before the afternoon feeding. Each steer was fed all that he would eat of meal and chop, without waste; and an accurate record of the weight of each feed was kept. A lump of rock salt was kept constantly in the feed-box of each animal. Every steer was weighed at the end of each ten days of the experiment.

The grain used was prepared by grinding with a mill of the "Giant" pattern, operated by two horses. I desire here to emphasize the importance of thorough grinding, especially where the cob is employed. Unless the cob is thoroughly pulverized — a difficult task with the cheap mills having slow motion — dainty animals will reject the coarse particles of cob, which soon accumulate in considerable quantities in the feed-boxes. I am fully convinced that the nearer to the condition of an impalpable powder ground feed is reduced, the greater its value.

In the tables following are given the weights of the steers during the progress of the experiment, with data in reference to gain (table I); the consumption of feed by each steer (table No. II); the average and actual gain as the feeding progressed (table No. III); the consumption of feed for one hundred pounds of steer (table No. IV); the cost in feed for one pound of increase (table No. V); while in table No. VI the general results of the experiment are shown in definite periods of time. In all cases the figures referring to weights in the tables indicate pounds and decimals thereof. Where, as in tables No. III and VI, the minus sign (—) precedes a number, a loss is indicated.

TABLE NO. I.

Weight of each steer each period (10 days) of the experiment, total gain, average gain, gain per cwt., and average gain per cwt.

PERIODS OF EXPERIMENT.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
December 19, begin. of experiment	750	790	845	825	865	820	760	825	1,030	800
December 29, first period	805	823	892	830	922	827	775	875	1,052	820
January 8, second period	805	840	900	835	940	845	800	865	1,062	795
January 18, third period	845	845	925	865	975	870	820	815	1,110	835
January 28, fourth period	850	880	945	870	975	890	845	875	1,140	865
February 7, fifth period	840	880	950	870	1,000	895	870	905	1,150	890
February 17, sixth period	900	910	975	905	1,020	930	865	930	1,170	895
February 27, seventh period	910	952	1,002	927	1,065	957	915	952	1,220	925
March 8, eighth period	885	960	1,020	940	1,080	980	930	970	1,250	950
March 18, ninth period	920	980	1,045	965	1,110	1,015	960	1,015	1,260	965
March 28, tenth period	910	990	1,065	960	1,085	1,020	920	1,020	1,260	970
April 7, eleventh period	915	995	1,070	990	1,150	1,020	940	1,020	1,290	985
April 17, twelfth period	985	1,055	1,120	1,000	1,170	1,050	945	1,070	1,305	1,020
April 27, thirteenth period	975	1,080	1,110	1,040	1,170	1,065	970	1,085	1,325	1,050
May 7, end of experiment	1,010	1,135	1,180	1,090	1,240	1,110	1,005	1,115	1,370	1,095
Total gain	260	345	335	265	375	290	245	290	340	295
Gain per cwt	35	44	39	32	43	35	43	35	33	37

Average gain, corn-and-cob meal feed, 316; average gain per cwt., 39. Average gain, corn-meal feed, 292; average gain per cwt., 35.

TABLE NO. II.

The amount of feed in pounds consumed by each steer each period (10 days), and the total amount of feed.

PERIODS.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
First period	165	146	176	151	150	133	145	165	188	121
Second period	111	134	140	111	163	124	112	110	192	80
Third period	133	136	159	120	137	132	119	129	170	124
Fourth period	158	157	175	151	181	140	135	158	193	149
Fifth period	156	155	169	160	184	147	148	179	200	151
Sixth period	148	148	173	144	200	164	165	161	200	147
Seventh period	153	162	163	153	196	162	161	170	198	147
Eighth period	125	137	131	153	165	146	159	167	198	133
Ninth period	122	145	145	140	122	170	180	178	200	159
Tenth period	152	157	160	142	181	177	176	173	200	135
Eleventh period	169	168	172	161	168	160	160	166	176	165
Twelfth period	183	155	204	180	200	162	194	181	207	152
Thirteenth period	213	206	220	219	223	179	214	218	219	195
Fourteenth period	203	233	234	223	236	169	175	215	234	201
Total feed consumed by each steer,	2,191	2,239	2,421	2,208	2,506	2,165	2,243	2,370	2,775	2,059

Total corn-and-cob meal feed consumed, 11,565; corn-meal feed, 11,612.

TABLE NO. III.

The actual and average gain of each steer each period (ten days) of the experiment.

PERIODS.	FEED — CORN-AND-COB MEAL.					Average gain……	FEED — CORN MEAL.					Average gain……
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*		*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*	
First period............	55	33	47	5	57	39.4	7	15	50	22	20	22.8
Second period.........	00	17	8	5	18	9.6	18	25	—10	10	—25	3.6
Third period..........	40	5	25	30	35	27.0	25	20	—50	48	40	16.6
Fourth period.........	5	35	20	5	00	13.0	20	25	60	30	30	33.0
Fifth period............	—10	00	5	00	25	4.0	5	25	30	10	25	19.0
Sixth period............	60	30	25	35	20	34.0	35	—5	25	20	5	16.0
Seventh period.......	10	42	27	22	45	29.2	27	50	22	50	30	35.8
Eighth period.........	—25	8	18	13	15	5.8	23	15	18	30	25	22.2
Ninth period..........	35	20	25	25	30	27.0	35	30	45	10	15	27.0
Tenth period..........	—10	10	20	—5	—25	—2.0	5	—40	5	00	5	—5.0
Eleventh period......	5	5	5	30	65	22.0	00	20	00	30	15	13.0
Twelfth period.......	70	60	50	10	20	42.0	30	5	50	15	35	27.0
Thirteenth period...	—10	25	—10	40	00	9.0	15	25	15	20	30	21.0
Fourteenth period...	35	55	70	50	70	56.0	45	25	30	45	45	40.0

TABLE NO. IV.

The amount of feed consumed each period (ten days) for each 100 pounds live weight of steer.

PERIODS.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
First period....................................	21.2	18.1	20.3	18.1	16.8	16.1	18.8	19.4	18.1	15.0
Second period................................	13.8	16.1	15.6	13.3	17.5	14.8	14.2	12.6	18.2	9.9
Third period....................................	16.1	16.1	17.4	14.1	14.3	15.4	14.7	15.4	15.7	15.2
Fourth period..................................	18.6	18.2	17.6	17.4	18.6	15.9	16.2	18.7	17.2	17.5
Fifth period.....................................	18.5	17.6	17.8	18.4	18.6	16.5	17.3	20.1	17.6	17.2
Sixth period	17.1	16.5	18.0	16.2	19.8	18.0	19.0	17.5	17.2	16.5
Seventh period................................	16.9	17.4	16.4	16.7	18.8	17.3	18.1	18.1	16.6	16.2
Eighth period	13.9	14.3	13.0	16.4	15.4	15.1	17.2	17.4	16.0	14.2
Ninth period	13.5	14.9	14.0	14.7	11.1	17.0	19.0	17.9	15.9	16.6
Tenth period....................................	16.6	15.8	15.2	14.8	16.5	17.4	18.7	17.0	15.9	13.9
Eleventh period	18.5	16.9	16.1	16.5	15.0	15.7	17.2	16.3	13.8	16.9
Twelfth period.................................	19.3	15.1	18.6	18.1	17.2	15.7	20.6	17.3	15.9	15.2
Thirteenth period............................	21.7	19.3	19.7	21.5	19.1	16.9	22.3	20.2	16.7	18.8
Fourteenth period............................	20.5	21.1	20.4	20.9	19.1	15.5	17.7	19.5	17.4	18.7

TABLE NO. V.

The amount of feed required to produce one pound of increase with each steer, each period (ten days), and the average amount in each series.

PERIODS.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
First period........................	3.00	4.42	3.74	30.20	2.63	19.00	9.67	3.30	8.55	6.05
Second period......................	*.........	7.88	17.50	22.20	9.05	6.89	4.48	*.........	19.20	*.........
Third period........................	3.33	27.20	6.36	4.00	3.91	5.28	5.95	*.........	3.54	3.10
Fourth period......................	31.60	4.49	8.75	30.20	*.........	7.00	5.40	2.63	6.43	4.97
Fifth period.........................	*.........	*.........	33.80	*.........	7.36	29.40	5.92	5.97	20.00	6.04
Sixth period........................	2.47	4.93	6.92	4.11	10.00	4.69	*.........	6.44	10.00	29.40
Seventh period....................	15.30	3.86	6.04	6.95	4.36	6.00	3.22	7.73	3.96	4.90
Eighth period......................	*.........	17.12	7.28	11.77	11.00	6.35	10.60	9.28	6.60	5.32
Ninth period........................	3.49	7.25	5.80	5.60	4.07	4.86	6.00	3.96	20.00	10.60
Tenth period........................	*.........	15.70	8.00	*.........	*.........	35.40	*.........	34.60	*.........	27.00
Eleventh period..................	33.80	33.60	34.40	5.37	2.58	*.........	8.00	*.........	5.87	11.00
Twelfth period....................	2.61	2.58	4.08	18.00	10.00	5.40	38.80	3.62	13.80	4.34
Thirteenth period...............	*.........	8.24	*.........	5.47	*.........	11.93	8.56	14.53	10.95	6.50
Fourteenth period...............	5.80	4.24	3.34	4.46	3.37	3.75	5.00	7.17	5.20	4.47
Amount of feed for 1 lb. of increase of each steer......	8.43	6.49	7.23	8.33	6.68	7.47	9.16	8.17	8.16	6.98

*No gain.

Average amount of feed for 1 pound of increase: Corn-and-cob meal, 7.32; corn meal, 7.95.

TABLE NO. VI.

A comparison of the results obtained in each series in definite periods of time.

PERIODS.	FEED—CORN-AND-COB MEAL. *Numbers 1, 2, 3, 4, 5.*							FEED—CORN MEAL. *Numbers 6, 7, 8, 9, 10.*						
	Total feed........	*Total increase........*	*Feed consumed for each 100 lbs. live wt..*	*Feed for 1 lb. of increase........*	*Gain per cwt. of steer.*	*Average daily feed of each steer........*	*Average daily gain of each steer........*	*Total feed........*	*Total increase........*	*Feed consumed for each 100 lbs. live wt..*	*Feed for 1 lb. of increase........*	*Gain per cwt. of steer.*	*Average daily feed of each steer........*	*Average daily gain of each steer........*
First period....................	788	197	18.9	4.0	4.8	15.76	3.94	752	114	17.5	6.6	2.7	15.04	2.28
Second period................	695	48	15.3	13.7	1.1	13.18	.96	618	18	13.9	34.3	.4	12.36	.36
Totals and averages for 20 days....................	1,447	245	17.0	5.9	6.0	14.47	2.45	1,370	132	15.7	10.4	3.1	13.70	1.32
Third period	685	135	15.6	5.1	3.1	13.70	2.70	674	83	15.3	8.1	1.9	13.48	1.66
Fourth period................	822	65	17.8	12.6	1.4	16.44	1.30	775	165	17.1	4.7	3.7	15.50	3.30
Fifth period....................	824	20	18.2	41.2	.4	16.48	.40	825	95	17.7	8.7	2.1	16.50	1.90
Sixth period..................	813	170	17.5	4.8	3.7	16.26	3.40	837	80	17.6	10.5	1.7	16.74	1.60
Totals and averages for 40 days....................	3,144	390	17.4	8.1	9.0	15.72	1.95	3,111	423	16.9	7.4	9.7	15.55	2.11
Seventh period..............	827	146	17.3	5.6	3.1	16.54	2.92	838	179	17.2	4.7	3.7	16.76	3.58
Eighth period................	711	29	14.6	24.5	.6	14.22	.58	803	111	16.0	7.2	2.2	16.06	2.22
Ninth period..................	674	135	13.6	5.0	2.8	13.48	2.70	887	135	17.3	6.6	2.6	17.74	2.70
Tenth period..................	792	-10	15.8	*.....	*.....	15.84	-.20	861	-25	16.6	*.....	*.....	17.22	-.50
Totals and averages for 40 days....................	3,004	300	15.3	10.0	6.4	15.02	1.50	3,389	400	16.8	8.5	8.4	16.94	2.00
Eleventh period..............	838	110	16.6	7.6	2.2	16.76	2.20	827	65	16.0	12.7	1.2	16.54	1.30
Twelfth period..............	922	210	17.7	4.4	4.1	18.44	4.20	896	135	16.9	6.6	2.6	17.92	2.70
Thirteenth period...........	1,081	45	20.2	24.0	.8	21.62	.90	1,025	105	19.0	9.8	1.9	20.50	2.10
Fourteenth period..........	1,129	280	20.4	4.0	5.2	22.58	5.60	994	200	17.8	5.0	3.6	19.88	4.00
Totals and averages for 40 days....................	3,970	645	18.8	6.2	12.9	19.85	3.22	3,742	505	17.4	7.4	9.7	18.71	2.52

*No gain.

For convenience in comparing the general results obtained in the two series, the following summary has been prepared. The figures in the vertical columns indicate pounds in every case:

Feed.	*Total feed........*	*Total gain........*	*Meal consumed for each 1 lb. of increase.....*	*Average daily feed............*	*Average daily gain of each steer...........*	*Gain per cwt. of each steer...*	*Average gain....*
Steers Nos. 1, 2, 3, 4 and 5—Feed: Corn-and-cob meal..	11,565	1,580	7.32	16.52	2.25	39	316
Steers Nos. 6, 7, 8, 9 and 10—Feed: Corn meal..	11,612	1,460	7.95	16.59	2.08	35	292

The above summary shows strikingly the advantages of the corn-and-cob meal over the clear corn chop. In every particular the advantage is in favor of the steers which were fed corn ground with the supporting cob. These steers consumed fewer pounds of feed daily and totally than those fed corn chop, making at the same time a larger gain per steer, and per hundred weight of steer, and at a considerable less cost of feed. In fact, this experiment seems to show quite conclusively *that a pound of corn cob when ground and fed to steers with the corn on which it grew is worth more than a pound of meal made from corn alone.*

This difference in the value of corn meal and corn-and-cob meal may be shown in another way, as follows:

11,565 pounds of corn-and-cob meal give 1,580 pounds of increase.

11,565 pounds of corn meal give 1,454 pounds of increase.

The question of the proportion of corn to cob in the corn-and-cob meal used in the above experiment is of importance in the above connection. The average result of a large number of weighings made during the progress of the experiment was 18 pounds of cobs to each 100 pounds of corn in the ear. It is needless to say that this eighteen per cent. of the yield of all Kansas corn fields, if the teachings of this experiment are to be relied on, is of very great importance to the agricultural interests of the State. The difference between the value of a bushel of corn ground with its cobs, and a bushel of shelled corn as shown by this experiment, is seen in the following statement:

One bushel (70 lbs.) corn-and-cob meal gives 9.56 pounds of increase.

One bushel (56 lbs.) corn meal gives 7.04 pounds of increase.

Or, to put this fact in another form: if the value of this increase was 5¼ cents per pound (the price at which the steers were sold), the value of the bushel of corn-and-cob meal was fifty cents plus a small fraction, and the value of the bushel of corn meal was something under 37 cents — a difference in favor of the corn-and-cob meal amounting to a trifle over 13 cents per bushel. Moreover, the steers to which the cob meal was fed were "off their feed" much less often than those receiving clear corn meal, and apparently they digested their food much better than those receiving the more concentrated grain. On this last point, I however, have no accurate data, and can only give the opinion freely expressed by those who were in position to notice the behavior of both sets of steers.

The cost of grinding this cob will vary with circumstances, but in any case a great outlay of power will be required. I am only approximately accurate in saying that with the power mill, operated with a ten-horse-power engine now in use, we can grind to the condition of fine "chop" about 25 bushels of shelled corn or 12 bushels of 70 pounds each of corn in the ear, in one hour. Other machines might give different results, and, under different circumstances, as where wind or water-power was available, the actual cost of grinding the cob might not be great.

I am glad to be able to say that the experiment here detailed is being repeated the present season, under somewhat more favorable circumstances, and that the question of the value of cob meal to hogs is also under examination at the College farm.

STALL-FEEDING.—The question whether fattening cattle may be profitably tied up and fed in a suitable building, is an open one in Kansas, where "stall-feeding" is quite unknown in practice. I wish here to call attention to the facts bearing upon this point, as furnished by this experiment:

1. The mere practical results of feeding the ten steers were certainly very satisfactory, not to say remarkable. The gain of 37 pounds per cwt., and total gain of 304 pounds per head in 14 weeks of feeding, Kansas feeders will recognize as indicating better results than those usually obtained in the ordinary "feed lot." The average daily gain and the cost in feed of each pound of increase are alike satisfactory, considered from the standpoint of the producer. That these results are largely due to the facts that the steers were tied up in comfortable quarters and fed regularly upon ground feed, can scarcely be questioned. Certainly the favorable

outcome of this feeding trial establishes a strong presumption in favor of stall-feeding.

2. The great expense of buildings is frequently urged as an insuperable obstacle to stall-feeding in the West. The cost of the building in which our ten steers were fed was exactly $105.37. This building — a plain battened board shed, 14x40 feet, with board roof — will, with ordinary usage, last at least a dozen years. It may also be used to advantage in many ways when not occupied by fattening animals. I am confident that I do not under-estimate the cost of buildings when I say that one dollar per head will fully cover the expense of each steer on account of the barn room he occupies.

3. The increased labor in caring for cattle confined in a building as compared with the labor required in handling them in the "feed lot," is often cited against the former practice. The care of the ten experimental steers under consideration occupied the time of one man about three hours daily; but besides the usual feeding, watering, bedding, etc., this labor involved such unusual work as weighing feed and recording weights, besides weighing the animals themselves at regular periods. In favor of stall-feeding, too, it must be said that all of the valuable manure made may be easily saved to the cultivated part of the farm, instead of being left to waste in an uncultivated feed lot. I am confident that upon every Kansas farm the cost of cleaning out the cattle stalls daily, and hauling the manure afield, is more than compensated for by the value of the manure thus saved. This saving of the manure, and the diminished waste of feeding, where cattle are confined to stalls, will go far toward paying for the increased cost of handling fattening cattle by this method.

4. It is often asserted that range cattle, and those unaccustomed to close confinement, will not thrive when restrained within the narrow limits of a stall. It is said that such cattle will pine and mope frequently for weeks together, meanwhile eating barely enough to sustain life. Our experience with these experimental steers runs quite counter to this view. These steers, when first placed in confinement, were the most untamed and untamable of half-wild range cattle. They could only be tied up by the sheer force of a half-dozen men, and when at first confined would dash themselves against the partitions and the sides of the building in paroxysms of terror For about two days after their confinement, they ate but little, for the obvious reason that ground corn was an unfamiliar feed to them; but after this time, the only difficulty experienced was in preventing them from over-eating. They devoured greedily all food that was placed before them, while the operations of feeding, bedding, and cleaning out the stalls, were attended with no special difficulties, so far as the cattle were concerned. Within a week from the time they were first tied up, no difficulties were experienced in leading them to water or to the platform scales — distant several rods from the feed-shed — on which they were weighed.

I am by no means clear in my own mind that the stall-feeding of cattle can be profitably followed in the West, but am abundantly satisfied that many of the reasons commonly urged against the practice are "notions" without foundation in fact. The question is one that can only be settled by that growing class of feeders who use the scales often, carefully estimating the cost of their operations.

CORN-AND-COB MEAL FOR PIGS.

In a previous chapter of this report, the results obtained in feeding fattening steers corn-and-cob are detailed. At the time when that experiment was undertaken it seemed to me to be useless to attempt a feeding experiment with pigs, using corn-and-cob meal as the feed. Further experience, however, showed that pigs will eat corn-and-cob meal when the cob is properly prepared, and they will consume it nearly or quite as well as clear corn meal, wasting but little more in feeding than is ordinarily wasted where clear corn meal is used, and digesting it without difficulty. This fact seems to show that either the cob possesses a greater nutritive value than is usually assigned to it, or the simple stomach of the pig has greater digestive capacity than might be expected from theoretical considerations. In the experiment under consideration, ten pigs — almost exact yearlings — were employed. Of these, six were purely-bred Berkshires and the remainder half-and-half Berkshire-Essex. They were, as a whole, a thrifty lot, and fairly uniform in all essential qualities. Substantially, the plan employed in my pig-feeding experiments of other years was adopted in this. The pigs were fed twice daily, at as nearly as possible 8 A. M. and 5 P. M., and the constant endeavor was to give each pig exactly the amount of feed which it would eat, and no more. The weight of each feed was taken, and a careful record made of the same. Each pig received water *ad libitum.* At the end of each week, a short time before the first feeding of the next week, all the pigs were weighed, and the weights recorded opposite the number of each animal upon the paper containing the record of the feed. The pigs were arranged in two series — Nos. 1 to 5 and Nos. 6 to 10 inclusive — the first series receiving as feed the meal obtained by grinding the whole ear of corn, including cob; while the second were fed exclusively upon corn meal. The experiment was begun on Nov. 21, 1884, and ended Feb. 13, 1885, occupying a period of twelve weeks. The feeding was conducted in a series of "pens" erected for the purpose. These pens were each about eight feet square, the system ranging north and south. They were rather more than half roofed, and the entire series, except pen 10, was protected on the north by the experimental steers' shed, and by a hay stack ranging parallel with the pig pens. These pens, although kept constantly supplied with an abundance of clean straw, were wholly insufficient for ordinary shelter and protection, to say nothing of the comfort of the pigs during such an unusually severe winter as that just passed. The pigs suffered almost constantly from the terrible cold. The result of this insufficient shelter is seen in the greatly increased cost in feed of each pound of increase as compared with the increase obtained in previous years, with animals kept in comfortable quarters. Thus, in the pig-feeding experiment made two years ago, the pigs kept in the warm barn gave a pound of increase for each 4.76 pounds of corn consumed, while, in the experiment under consideration, the corn-fed pigs required 6.7 pounds of corn for each pound of gain.

I am glad to be able to say that the necessity for performing our experimental work in temporary and inconvenient sheds will not exist after the present year; our State Legislature having recently appropriated $4,500, to be used in the construction of an experimental barn upon the College farm.

As before stated, these pigs to which the corn-and-cob meal was fed consumed their rations almost, if not quite as quickly and with as great a show of appetite as those receiving the clear corn meal. During about the third and fourth weeks, when the sameness of diet had measurably blunted the appetites of the pigs, a disposition to pick out the particles of corn from the coarse pieces of cob was manifest. With feed of more uniform fineness, and with greater care in apportioning the feed, this difficulty was not felt.

For the most part, the pigs received meal in the ordinary condition, without admixture with water; but during the prevalence of the greatest cold, the feed in both series was mixed with warm water, giving it the consistence of a thick mush.

In the tables given below, the principal results of the experiment are given. In table No. I, the facts are grouped with reference to each animal; while in table No. II, the results are given in definite periods of time.

TABLE NO. I.

The results obtained with each pig, in pounds, together with the total and average results.

NO. OF PIG.	Weight of each pig at beginning of experiment	Weight of each pig at end of experiment	Gain	Gain per cwt.	*Feed consumed (lbs).* Corn meal	*Feed consumed (lbs).* Corn-and-cob meal	*Feed (lbs.) consumed for each cwt. of pig.* Corn meal	*Feed (lbs.) consumed for each cwt. of pig.* Corn-and-cob meal	*Feed (lb.) for one lb. of increase.* Corn meal	*Feed (lb.) for one lb. of increase.* Corn-and-cob meal
	FEED — CORN-AND-COB MEAL.									
1	207	329	212.0	58.9		777		289.9		6.37
2	164	279	115.0	70.1		727		328.2		6.32
3	191	318	127.0	66.0		694		272.7		5.46
4	181	278	97.0	53.6		689		300.2		7.12
5	222	318	96.0	43.2		732		271.1		7.62
Totals	965	1,522	557.0			3,619				
Averages	193	304.4	111.4	57.7		723.8		291.0		6.50
	FEED — CORN MEAL.									
6	172	297	125	72.6	770		327.0		6.16	
7	180	328	148	81.1	798		314.2		5.39	
8	231	344	113	48.9	777		270.2		6.88	
9	250	380	130	52.0	880		279.4		6.77	
10	190	246	56	29.5	607		278.4		10.84	
Totals	1,023	1,595	572		3,832					
Averages	204.6	319	114.4	55.9	766.4		292.7		6.7	

TABLE NO. II.

The results obtained each week in both series, together with the total and average results.

PERIODS.	FEED—CORN-AND-COB MEAL. *Pens 1, 2, 3, 4, 5.* Feed, lbs	Gain, lbs	Gain (lbs) per cwt. of pig	Feed (lbs) for 1 lb. of increase	FEED—CORN MEAL. *Pens 6, 7, 8, 9, 10.* Feed, lbs	Gain, lbs	Gain (lbs) per cwt. of pig	Feed (lbs) for 1 lb. of increase
November 28, end of first week	339	50	5.18	6.78	341	88	8.60	3.87
December 5, end of second week	313	70	6.90	4.47	307	78	7.03	3.93
December 12, end of third week	321	57	5.25	5.63	352	57	4.79	6.18
December 19, end of fourth week	313	28	2.45	11.18	316	37	3.20	8.54
December 26, end of fifth week	315	48	4.10	6.56	340	31	2.43	10.97
January 2, end of sixth week	315	57	4.68	5.53	338	42	3.19	8.05
January 9, end of seventh week	308	52	4.08	5.94	310	63	4.66	4.92
January 16, end of eighth week	291	29	2.19	10.03	331	21	1.48	15.76
January 23, end of ninth week	292	44	3.24	6.64	292	29	2.02	10.07
January 30, end of tenth week	306	42	3.00	7.29	332	77	5.24	4.31
February 6, end of eleventh week	277	65	4.50	4.26	325	77	4.91	4.22
February 13, end of twelth week	229	15	1.00	15.13	248	—28		
Totals	3,619	557			3,832	572		
Averages	301.06	46.4	57.7	6.5	319.3	47.7	55.9	6.7

The summary of the facts of the experiment given below will aid in a comparison of the results obtained. The figures in the vertical columns refer to pounds or decimals thereof in every case:

	Total feed.........	*Total gain.........*	*Meal consumed for each pound of increase.......*	*Average daily feed of each pig..*	*Average daily gain of each pig..*	*Gain per cwt. of each pig..........*	*Average gain per pig..............*
Pigs Nos. 1, 2, 3, 4 and 5 — Feed, corn-and-cob meal...	3,619	557	6.50	8.6	1.33	57.7	111.4
Pigs Nos. 6, 7, 8, 9 and 10 — Feed, corn meal..............	3,832	572	6.70	9.1	1.36	55.9	114.4

The facts furnished by this experiment strongly support the deductions made from the experiment in feeding steers (see pages 104 and 105 of this report), detailed in another chapter. Of these steers, I said: "In every particular, the advantage is in favor of the steers which were fed corn ground with the supporting cob. . . . In fact, this experiment seems to show quite conclusively *that a pound of corn cob, when fed to steers with the corn with which it grew, is worth more than an equal amount of meal from corn alone.*"

This statement is almost exactly true of these experimental pigs; the only exception being in the total gain — an immaterial point — which was slightly less with the corn-and-cob-fed pigs than with those receiving corn meal.

The somewhat extraordinary results given by pig No. 10 as shown in table No. I are probably largely due to the imperfect protection which he received from the winds. Although when put up he was not inferior in appearance to No. 2 or No. 4, he yet fed poorly, and seemingly was almost constantly suffering from the severe cold weather which prevailed during much of the time covered by this experiment. If, as has been suggested, No. 10 be thrown out, then the results will show a trifling advantage for the pigs receiving clear corn meal; the average cost of a pound of increase of the corn-fed pigs being 6.23 lbs. of meal to 6.5 lbs. with the pigs getting corn-and-cob. But the unusual results obtained in the case of No. 10 are doubtless chargeable to other causes than an ill-sheltered pen; and if we throw out the poorest feeder in one series, it would seem only fair to discard the poorest feeder in the other series, in which case the cost in feed of a pound of increase (6.26 lbs. in series No. 1 and 6.23 lbs. in series No. 2) is almost identical in the two sets.

The very close analogy between the results of this experiment and those obtained with steers fed under similar circumstances as to feed, one year ago, are shown in the following parallel statements: Thus, with the steers fed 1 bushel (70 lbs.) corn-and-cob meal gave 9.56 pounds of increase (see p. 104 this report); while with the pigs 1 bushel (70 lbs.) corn-and-cob meal gave 10.76 pounds of increase; and with the steers again 1 bushel (56 lbs.) corn meal gave 7.04 pounds of increase, while with the pigs 1 bushel (56 lbs.) of corn meal gave 8.35 pounds of increase. The fact that the pigs were fed during the late severe winter season, while the steers were fed during the comparatively mild winter of 1883–4, is a sufficient explanation of the near approach of the cost of a pound of increase of the pigs to that of the steers. That an animal possessing the comparatively simple digestive apparatus of the pig is able, almost equally with the ox, possessing complex and extended digestive machinery, to use the cob as feed, would seem to indicate that it exerts something more than a mere mechanical influence in nutrition.

THE PORK PRODUCT OF A HALF-ACRE OF ALFALFA.

The writer has more than once, through the public press, urged upon Kansas farmers the importance of the cultivation of the perennial grasses and clovers as summer feed for hogs. The "hog pasture" or "hog lot" is, in too many cases, selected solely because it is furnished with shade and water. It is almost certainly a very limited field, considerations of economy in fences, and not the size of the herd, generally fixing its area. As a result of this mistaken economy, it is as a rule a noisome, disease-breeding "pen" on a somewhat enlarged scale, and not a pasture-field in any proper sense. The "hog pasture" should not be one whit less a pasture than the summer feeding-ground of cattle. Both hogs and cattle, the one no less than the other, need pure water and succulent herbage and clean quarters; and it is at least doubtful if cattle pay as liberally for these as swine. An item of general experience in this connection may be of interest: During nearly six months of the past season a herd of breeding sows, some seven in number, with a variable number of store hogs, were with cattle kept in a pasture-field, receiving no other feed than the orchard-grass, clover and alfalfa furnished by the field. Upon herbage alone, these hogs kept in perfect health and in heavy flesh. Ample summer pasturage for our hogs will insure to the owner cheaper pork of better quality than is now in general practice made, and to the herds an immunity from disease which they have not heretofore enjoyed. Of all the grasses and clovers suitable to this latitude, alfalfa is one of the most useful, if not the most useful, for hog pastures, on account of its perennial habit, and because it is but slightly affected by drouth, furnishing during a long season an enormous quantity of feed of the best quality. With the object of furnishing accurately-determined facts regarding the value of alfalfa to the hog-raiser, the experiment detailed below was undertaken:

In the spring of 1884 an exact half-acre, occupied by a dense growth of alfalfa seeded one year before, was secured by a substantial fence. The original plan was to keep upon the ground a sufficient number of pigs to consume the growing alfalfa without the addition of grain, avoiding waste on the one hand or overpasturing on the other. The plan involved, further, the weighing of the pigs about once each month, in order that the rate of development might be noted.

On May 12th, thirteen six-months-old shoats were quartered on this half-acre. Of the thirteen pigs, eight were Essex-Berkshires, and the remaining five pure-bred Berkshires. At this time the alfalfa was about ten inches high, forming a dense growth, which occupied every foot of the ground. In a concise statistical form, the facts of this experiment may be stated as follows:

May 12 thirteen pigs turned to alfalfa, total weight	1,225 lbs.
June 10 " " weighed	1,254 lbs.
Gain in 29 days	29 lbs.

It was apparent that the field had been overstocked. Thirteen shoats, averaging in weight nearly a hundred pounds each, had wants beyond the capacity of a half-acre, even of alfalfa, to supply. As the pigs had depastured the ground very closely, it was determined to feed a small daily ration of corn. This daily feed — two pounds of corn in the ear, per pig — was fed through the remainder of the season, except during half a month, when three pounds were fed.

June 10th three pigs were removed, leaving ten pigs in the field, weighing	1,079 lbs.
July 10th the ten pigs weighed	1,315 lbs.
Gain in 30 days	236 lbs.
The pigs were next weighed August 8th, their weight at this time being	1,470 lbs.
Gain from July 10th, twenty-nine days	155 lbs.

During July and the early part of August dry weather prevailed, so that the alfalfa did not make the rapid growth shown earlier in the season. For this reason, on August 16th, the ten pigs were weighed, and four of these withdrawn from the experiment.

August 16th the weight of the ten pigs was	1,488 lbs.
Gain from August 8th, eight days	18 lbs
August 16th, weight of the six pigs remaining	896 lbs.
September 11th, weight of the six pigs remaining	1,047 lbs.
Gain from August 16th, twenty-six days	151 lbs.
September 11th, weight of six pigs	1,047 lbs.
October 13th (end of experiment), weight of six pigs	1,175 lbs.
Gain from September 11th, thirty-two days	128 lbs.

The pigs were actually kept in alfalfa pasture some two weeks after the last weighing. About the end of October the pigs made their escape from the alfalfa field, joining the general herd, from which it was found difficult to separate them, so that no attempt was made to weigh them. By this accident the experimental half-acre fails to get credit for the support which it gave six pigs during these two weeks. In the following table, the results of the experiment are given in detail:

Period.	*No. of pigs...*	*Average weight of pigs (lbs)...*	*Gain in lbs...*	*Total daily gain...*
May 12th to June 10th	13	95	29	1.00
June 10th to July 10th	10	119	236	7.86
July 10th to August 8th	10	139	155	5.34
August 8th to August 16th	10	148	18	2.25
August 16th to September 11th	6	162	151	5.80
September 11th to October 13th	6	185	128	4.00

The half-acre of alfalfa with a small daily ration of corn gave—

Support during 154 days to rather more than nine pigs having the average weight of 140 pounds.

It yielded daily 4.65 pounds of pork.

" " a total of 717 pounds of pork.

The total amount of corn—in the ear—consumed by these pigs from June 10th, when corn was first fed, to the time when the experiment was brought to a close, amounted to 2,146 pounds, rather more than two pounds daily for each animal during the time when corn was fed. Of this, 18 per cent., or 386 pounds, consisted of cob. Deducting this, and we have 1,760 pounds, the amount of corn actually used. The value of this corn can only be approximated. In my pig-feeding experiments of 1883, the pigs fed in the warm barn gave one pound of increase for each 4.76 pounds of corn; and those kept in the open yard required 5.93 pounds of corn for each pound of gain. Taking the mean of these figures—5.34—as the number of pounds of corn required to make a pound of increase, in the experiment under consideration, and we have as the product of this 1,760 pounds of corn—discarding fractions—329 pounds of pork. Deducting this amount from the total amount of pork-yield of this half-acre—717 pounds—and we have as the net yield of the half-acre of alfalfa, 388 pounds of pork.

When we reflect that the returns from this half-acre came without plowing, seeding or harvesting, or, indeed, labor of any kind, except the trifling work involved in the daily feed of corn, the great value of alfalfa to the hog-raisers will be understood. Moreover every swine-raiser will, I think, agree with me that the quality of the flesh produced by this green feed was really worth more, pound for pound, than the fat ordinarily produced by feeding wholly of constipating grains. The pigs fed thus upon green feed were in the best possible condition to make the most of the corn fed in the subsequent "full feeding."

It may, I think, easily be shown that an acre of perennial alfalfa, when fed off, as in the experiment, by pigs of good quality, will give a larger yield of pork than an acre of grain laboriously produced. Thus the number of pounds of pork produced by an acre of alfalfa, according to the data furnished by the half-acre under consideration, would be 776; while sixty bushels of corn (3,360 pounds), supposing as before that 5.34 pounds of corn produce one pound of increase in the pigs to which it was fed, would give a gain of 629 pounds, or 147 pounds less than the product of an acre of alfalfa.

Whether alfalfa is a sufficient feed for fattening hogs, is a question which received no consideration in the experiment detailed, and no inferences bearing on that point can be safely drawn from it. The constant aim during the entire season was to consume without waste the alfalfa as it grew, while keeping the pigs in good store condition.

DEEP AND SHALLOW PLOWING AND THOROUGH CULTIVATION FOR CORN.

In my report of experiments for 1883, the details of an experiment in subsoiling corn ground were given. This trial seemed to show that the subsoiling was in every case a partial injury, every subsoiled plat giving a lower yield of corn than the average yield of those plats which were simply plowed to the ordinary depth of six inches. The subsoiling features of this experiment were repeated the past season on different ground, upon which, also, the practice of close and deep cultivation of corn was compared with superficial cultivation. For the purposes of the experiment above referred to, ten plats, each one-twentieth of an acre, were laid off in field No. 4. The soil of this field is a strong clay, of only moderate fertility. The field has been in cultivation for at least twelve years, receiving during this time at least three thorough dressings of farm-yard manure.

The general plan of these experiments is shown in the diagram on the following page. The ten plats ranged east and west continuously, except that every plat was separated from the two adjoining by a two-foot space, which was not cultivated. Each alternate plat was simply plowed to the depth of six and one-half inches, while the plats separating these "nothing" plats received special treatment, as shown in the diagram.

The experimental ground was plowed May 19th, at which date the work, including the subsoiling, was finished. In the subsoiled plats, the subsoiler, working to the depth of four inches, followed the stirring-plow, which cut a six-and-one-half-inch-deep furrow; so that the ground in the subsoiled plats was stirred to the depth of ten and one-half inches. The corn was planted in rows three and one-half feet apart, the corn plants standing about ten inches apart in the drills. The variety of corn employed was the medium-sized "King Philip."

PLAN OF EXPERIMENT.

SIZE OF EACH PLAT, $\frac{1}{20}$ ACRE.

Plat A—Plowed 6½ inches deep; subsoiled 4 inches deep.

Plat B—Plowed 6½ inches deep.

Plat C—Plowed 3 inches deep.

Plat D—Plowed 6½ inches deep.

Plat E—Plowed 6½ inches deep; subsoiled 4 inches deep.

Plat F—Plowed 6½ inches deep.

Plat G—Plowed 6½ inches deep; deep cultivation.

Plat H—Plowed 6½ inches deep; shallow cultivation.

Plat I—Plowed 6½ inches deep; deep cultivation.

Plat J—Plowed 6½ inches deep; deep cultivation.

Upon the plats G, H, I and J, different methods of cultivating the growing corn were employed. These plats were cultivated — the ordinary one-horse cultivator being used — four times, at intervals of about ten days. At the first cultivation all plats were lightly dressed out, the cultivator passing twice in each row. At the subsequent operations, plats G and I were cultivated but once in a row, and then quite superficially, while in plats H and J the cultivator was made to pass twice in each row, very close to the rows of corn, and to the depth of nearly five inches. In these last-mentioned plats, the ground was literally churned by the cultivator; and at each operation the implement brought to the surface great quantities of white fibrous rootlets, torn by the implement from the corn plants.

The results of the experiment are clearly shown by the subjoined table:

Plats.	*Yield of plat—corn, lbs.....*	*Yield of plat—stalks, lbs.....*	*Yield per acre—corn, bushels, 70 lbs.....*	*Yield per acre—stalks, tons.*
Plat A, plowed 6½ inches deep and subsoiled 4 inches	233	182	66.57	1.82
Plat B, plowed 6½ inches deep	213	132	60.85	1.32
Plat C, plowed 3 inches deep	214	152	61.14	1.52
Plat D, plowed 6½ inches deep	228	168	65.14	1.68
Plat E, plowed 6½ inches deep and subsoiled 4 inches	216	172	61.71	1.72
Plat F, plowed 6½ inches deep	211	128	60.29	1.28
Plat G, plowed 6½ inches and worked deep with cultivator	244	191	69.71	1.91
Plat H, plowed 6½ inches and worked shallow with cultivator	247	182	70.71	1.82
Plat I, plowed 6½ inches and worked deep with cultivator	243	179	69.43	1.79
Plat J, plowed 6½ inches deep and worked shallow with cultivator	246	184	70.29	1.84

SUMMARY.

Plats.	*Average yield of plat, corn, pounds.........*	*Average yield of plat, stalks, pounds.......*	*Average yield per acre, corn, pounds.......*	*Average yield per acre, stalks, tons.*
Plats A and E—subsoiled	224.5	177.0	64.1	1.77
Plats B, D and F—nothing; plats adjacent subsoiled plats	217.3	142.6	62.1	1.42
Plat C—plowed three inches deep	214.0	152.0	61.1	1.52
Plats B and D—nothing; plat adjacent plat C	220.5	150.0	63.0	1.50
Plats G and I—worked deep with cultivator	243.5	185.0	69.6	1.85
Plats H and J—cultivated shallow	246.5	183.0	68.1	1.83

A glance at the tables will show that neither of the specially-treated plats had any considerable advantage over those treated in the ordinary fashion. The fluctuations in the yield, as shown in the tables, may as safely be charged to slight differences in the soil of the different plats, or to errors which could not be guarded against, as to the particular treatment given the different plats. Had all of the plats received exactly the same treatment, I should have expected variations at least as great as those shown in the tables. The results of subsoiling, as shown here, agree substantially with those obtained one year ago in another field, where the subsoiled plats showed a slight loss as compared with plats adjoining which were planted in the usual manner, both showing that very deep tillage is not advantageous, even upon strong clay lands, during favorable seasons. In a season of drouth, different results from these might be expected.

The experiment seems to show, too, that the methods usually reckoned injurious, as for example shallow plowing and very deep and close cultivation of tall, well-grown corn, had no unfavorable influence upon the crop. It seems to be sufficient, in a Kansas corn-field of ordinary productiveness, that the ground shall receive moderate cultivation, and be kept free from weeds, as in the case of these experimental plats; and with these conditions complied with, the soil and the season will do the rest. After our soils, from long-continued and injurious cultivation, have become physically altered for the worse, and have parted with much of their present nitrogenous stores, we may expect that the corn crop will respond more readily to variations in its culture and general treatment. As it is, the cheapest method—the one least expensive in labor—is generally the most valuable to our farmers; and the question of the relative cheapness of methods is not one that may be determined by an experiment—conducted as an experiment must be—on a small scale.

FARM-YARD MANURE APPLIED TO MILLET GROUND.

In my report for 1883, (p. 19,) the details of an experiment with farm-yard manure applied to corn ground, were given. In this experiment it was shown that the application of manure at the rate of twenty-eight loads per acre had given no increase in the yield of grain, but a very considerable increase in the yield of stalks. The plats treated to manure (plats M and N) in 1883 were, without any further application of manure, or other special treatment, plowed late in the following spring, and seeded to the common millet so generally cultivated in this State as a hay crop. The millet was sown January 13th, harvested August 22d, and hauled to the barn in the condition of excellent hay on August 25th. Below is given the yield of the manured plats, and for comparison, the product of the adjacent "nothing" plats which received no application of manure:

Plats.	*Yield of plat in hay, lbs.*	*Yield per acre, tons.*
Plat L — nothing	240	2.4
Plat M — manured	360	3.6
Plat N — nothing	200	2.0
Plat O — manured	310	3.1
Manured plats M and O, average	335	3.35
Nothing plats L and N, average	220	2.2
Increased yield of manured plats	115	1.15

The lesson taught by this simple trial is, like most agricultural truths, a very old one, but one nevertheless that is well worth repeating. That manure should prove indifferent or even injurious to crops the first season after its application, while acting with great efficiency during the second, third, fourth, or even fifth year, agrees with the general experience of many years upon the College farm.

EXPERIMENTAL GRASSES AND CLOVERS.

In my report for 1883, a full statement of those facts likely to be most serviceable to the practical man is given, regarding those grasses and clovers which in an experience of nearly a dozen years upon the College farm have proved to be fairly reliable in general cultivation. In that report the great value of orchard-grass, alfalfa, and red clover, for central Kansas, was particularly emphasized. The opinion then expressed, we have since seen no reason to change, and this view, judging from the reports of experiences given by farmers in the local press of the State, Farmers' Institutes, and in the reports of the State Board of Agriculture, is being rapidly confirmed in general practice. While it is true that other sorts, like oat-grass, Kentucky blue-grass, and timothy, are, in certain soils and under certain conditions, even more valuable than those mentioned above, it is yet true that they are suited to a greater number of wants and conditions than any that we have experimented with. In reply to the objection that the number given is extremely limited, it may be said that the number of grasses and clovers finding popular favor is, in any section, extremely limited. In New York and the Middle States, timothy, clover, and a small amount of red-top, are almost the only perennial forage plants of recognized value in general practice. In Illinois, Kentucky and Missouri, Kentucky blue-grass, timothy and red clover, are with much smaller areas of orchard-grass and red-top in general cultivation. Nor is it likely that this condition of things in respect to the grasses will soon be changed. Farmers, as a class, are not apt at drawing nice distinctions; so that those few sorts which answer to the rougher general requirements of the farm, are certain to obtain general favor. However, as our agriculture becomes more diversified, an increased demand is certain to arise for varieties whose value is limited to a few purposes. With the object of adding to the number of our agricultural grasses and clovers, we have, for a number of years, cultivated in alternate plats, and, with increased experience with them, on larger areas, sorts not generally cultivated in Kansas, or those whose qualities are not generally known. Below is given our recent experience upon the College farm with some of these less-known varieties.

Alfalfa (*Medicago sativa*).—So far as the College farm is concerned, this variety has long since passed the experimental stages of its cultivation. We have cultivated it upon almost every kind of soil and with unvarying success since 1875. (For a full statement of our methods of cultivating and the results obtained, the reader is referred to page 23 of my report for 1883.)

Something of the value of alfalfa for a particular purpose is shown in another chapter of this report. (See page 29.) Nevertheless, many reports of more or less complete failures, made by painstaking farmers, came to me from widely different sections of the State. I am inclined to think that the cause of these failures is to be found in the character of the subsoil in which the alfalfa was grown. Impervious or barren subsoils are equally to be avoided in the cultivation of alfalfa, and where these are suspected, they should first be brought into "condition" by the use of the subsoiler in one case and manure in the other.

Annual Clover, or Scarlet Italian Clover—(*Trifolium incarnatum.*)—In April, a plat of ground about three rods square was sown with this sort, the seed having been obtained from a seed-house in Georgia. This seed germinated abundantly and early in the season; the plants made a fairly vigorous growth. Later, the summer heats seemed to check its growth severely, so that at no time was it able to keep pace with the growth of weeds which came up in the plat. At no time did it make an equal growth with the red clover (*T. pratense*), seeded the same season, which grew near by. All of the plants were dead before October 1st.

Bermuda Grass (*Cynodon dactylon*).—This variety I have grown on a small area something over three years. During this time it has made a feeble, hesitating growth, never spreading much beyond the limits of the ground originally assigned to it. In my report of last year I said of this grass: "Of all the 'tame grasses,' it is latest to appear in the spring, and the lightest frost cuts it off level with the ground. Until the hot weather of June had set in, our Bermuda grass showed scarcely any sign of life and growth. But even then the amount of feed which it furnishes is quite insignificant. Moreover, our stock of all kinds showed no great fondness for it, leaving it always for orchard grass growing near by." The winter of 1883–84 completely killed our Bermuda grass, a sort which possesses not one quality of real value to Kansas farmers.

Johnson Grass (*Sorghum halapense*). This grass we have had in cultivation for three years with no satisfactory results, if we consider the subject from the standpoint of the agriculturist. During each of the three winters last past, it has severely winter-killed—apparently totally—the grass plat maintaining its continuous existence, it would seem, from a few scattered seeds which had found a lodgment beneath masses of rowen and stubble. Moreover, the first frosts of fall cut it level with the ground. These reasons alone seem to justify the worthless character given it in previous reports; but, when we add to this, the fact that this grass has never with us made its appearance above ground much before the first of June, when orchard-grass, clover and alfalfa are ready for the scythe; that the hay which it yields is coarse, woody, and not much relished by stock—there would seem to be no question of its worthlessness to this section of the State. In those sections in which this grass does not suffer from severe winters, and where the more valuable tame grasses cannot be grown, we understand that Johnson grass has considerable value; but in any locality where the better sorts of cultivated grasses and clovers may be successfully grown, it has no agricultural value.

Tall Meadow Oat-Grass (*Avena elatior.*)—This grass we have grown in the field upon a considerable scale for three years, and with uniformly satisfactory results. It is one of the earliest grasses in the spring, being fully one week in advance of orchard-grass, and it retains its bright green color far into the winter. Oat-grass gives a very large yield of hay, which I am bound to say is only moderately relished by stock. It endures moderately dry seasons without injury, and makes abundant early and late pasturage. In giving these facts, I think I have stated the principal points of advantage of tall meadow oat-grass.

On the other hand it seems to be quite exhausting to the soil on which it grows, so that its cultivation is not likely to prove satisfactory for a length of time except upon land of a good degree of fertility. Moreover, it is like timothy, in that it gives but little pasturage after mowing, and before the late fall rains have set in. I consider this sort well worthy of a trial on most Kansas farms, and shall expect to see its cultivation greatly extended.

TEXAS BLUE-GRASS (*Poa arachnifera.*)—In the spring of 1884 I obtained from a gentleman in Texas a supply of small plants of the above-named grass. These plants during the month of April were set out in rows, each plant receiving about one square foot of ground. Nearly all of the plants survived transplanting, and, although a dense growth of purslane came up and occupied the ground between the plants, they grew and thrived from the first. This grass seems to promise much for the winter grazier, and to speak from my brief experience with it, it is greatly superior for use in this section of the State, to its near relative, Kentucky blue-grass. It makes a very early and vigorous growth, and it retains its peculiar purple-green color through the entire winter. Texas blue-grass has a much coarser habit than the Kentucky blue-grass, and apparently does not make the compact sod so characteristic of the common blue-grass. Whether this grass will endure close cropping, and be able to withstand uninjured the peculiar exigencies of our climate, and the palatableness to live stock of the pasturage which it yields, are matters of which I can only speak after further trial. At the present I can only say that Texas blue-grass deserves a high place among our experimental grasses.

SHRINKAGE OF CORN IN THE CRIB.

The question, how much if any, corn loses in weight by evaporation or other causes, while remaining in the crib during the winter months, was the subject of a test employed during the past winter. On November 1st, 200 pounds of corn in the condition of ears, was placed in a box which had been secured in a position near the center of an ordinary corn crib with a capacity of about six hundred bushels. The corn used was an early-ripening sort, which had been ripe fully six weeks before it was husked. Although the corn was taken directly from the field to the box, it was in a condition of almost perfect dryness. Soon afterwards the crib was filled, in which condition it remained until near spring, when a portion of the corn in the crib was removed, never, however, in sufficient quantity to uncover the box.

On July 1st, exactly eight months from the time when the corn had been set aside, the box was opened and its contents found to be in good condition, but weighing only 187½ pounds. The two hundred pounds had lost by evaporation exactly twelve and a half pounds, or rather more than six per cent.

It would seem from this that the farmer who carries his corn crop until spring, in the hope of realizing higher prices thereby, should be very sure of a six-per-cent. increase in value; and, considering the inevitable losses from vermin and the elements, something more, if in the spring the corn realizes what it would have fetched in the fall.

Whether the loss is from the grain or the cob of corn, I am unable to say positively, but from some recent experience had in weighing corn of different degrees of dryness, I am inclined to the belief that the loss is mostly from the cob.

WHEAT CONTINUOUSLY ON THE SAME GROUND.

For four consecutive years a measured acre of ground has borne crops of wheat, the land during this time receiving no manure or dressing of any kind. During each year since the first, the ground has been plowed soon after the removal of the wheat crop, and generally a second plowing has been given the land early in September, a short time before the wheat was sown. The soil is a strong clay of moderate fertility. The following table gives the results of the four years of continuous cultivation of wheat on this acre:

Varieties.	*Yield of grain, bu.*	*Yield of straw, lbs.*	*Straw (lbs.), to pound of grain.*
1880–81......Variety, Early Red May	9.00	....	....
1881–82...... " " " "	47.00	7,845	2.70
1882–83...... " " " "	28.19	3,281	1.90
1883–84...... " Zimmerman	37.00	4,525	2.03
Averages	30.29	5,217	2.30

FARM EXPERIMENTS

AT THE KANSAS STATE AGRICULTURAL COLLEGE 1885.

The report herewith submitted has no higher ambition than to state clearly the facts of a year of experimental work done upon the College farm. Not much attention is here given to underlying theories, or to the opinions which reasonably enough might be formed of the facts stated, in the belief that the needs of practical agriculture lie in the direction of the multiplication of facts rather than principles, and that opinions, however well based, when acted upon under varying circumstances are liable to mislead.

The facts here detailed will be likely to prove useful in just so far as they receive intelligent applications as the circumstances of farmers suggest. The unthinking adoption of experimental facts is as much to be deprecated as their thoughtless rejection. Circumstances of soil, climate, location and markets may give to experimental facts great value, or make them worthless. Experiments at the most cannot be much more than suggestively useful; the experimenter may furnish facts for the farm, but he cannot do the farmer's thinking. The obvious inference from all this is, that in a very considerable degree every farmer must be an experimenter — a truth having especial application in new counties having no historical agriculture.

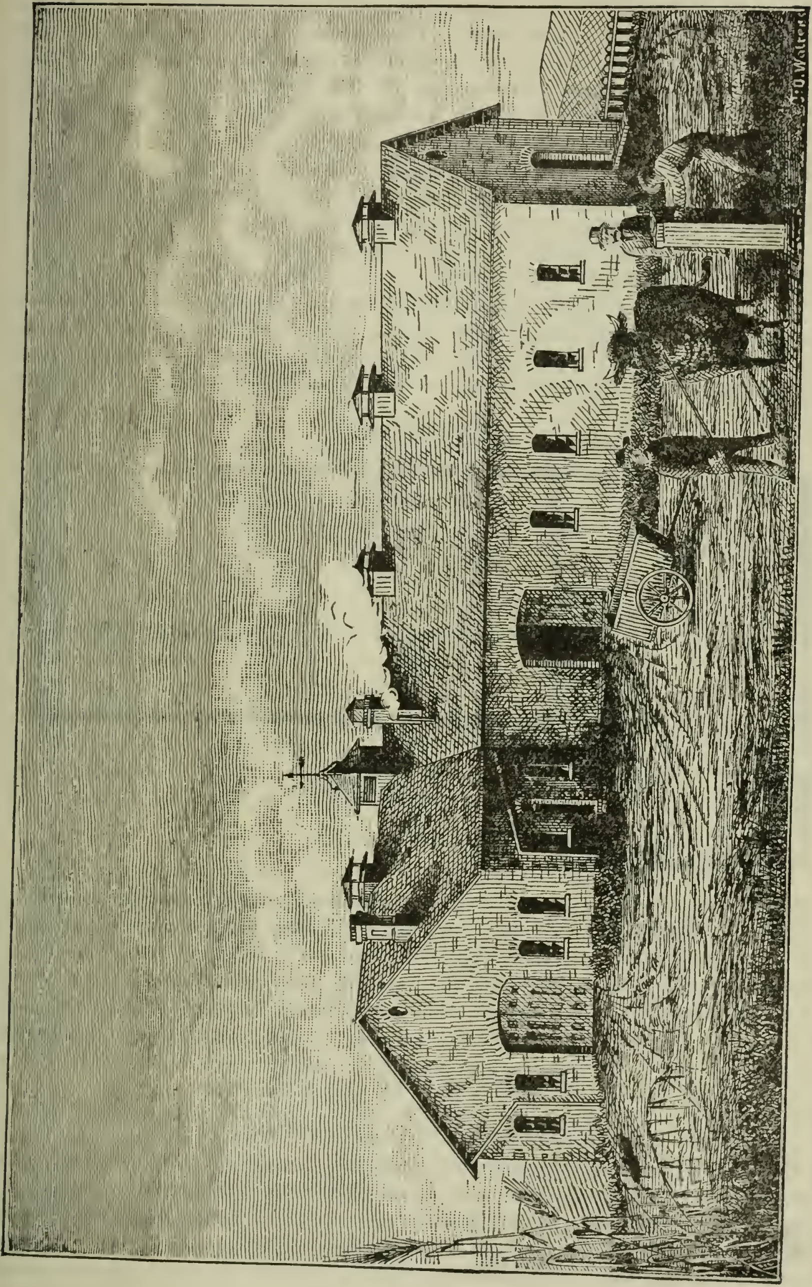
To Regents Forsyth, Moore and Henshall, the Farm Committee of the Board of Regents, my acknowledgments are due for the constant interest they have shown in the work of the department; to W. Whitney, foreman of the farm; and to students of the College, to whom much of the details of the experimental work, including the feeding and care of experimental animals, have been intrusted.

E. M. Shelton, *Manhattan, Kansas.*

THE COLLEGE BARN.

The College barn — or rather system of barns — is designed in part for experimental uses, a considerable part, however, performing the functions of the general-purpose barn. The cut shows the front and westerly exposure of a connected structure, built at two different times, as the result of appropriations made for that purpose during the legislative sessions of 1876–77 and 1884–85. That portion of the building having its greatest extension north and south was built in 1877; the annex placed at right angles to this — the experimental barn proper — was finished ready for occupation in December last.

The entire structure is placed in a side-hill, sloping towards the east, and having a variation from the horizontal of about three feet in fifty. That portion of the building first constructed was planned for a farm carrying out a system of mixed husbandry, in which the growth of grains and grasses with stock-raising have about equal prominence. The newer portion, that having its greatest extension in the direction east and west, was planned with especial reference to the wants of the farm in its experimental operations. However, in the description which follows, "the barn" will in every case have reference to the entire structure, as shown in the cut, on p. 121.



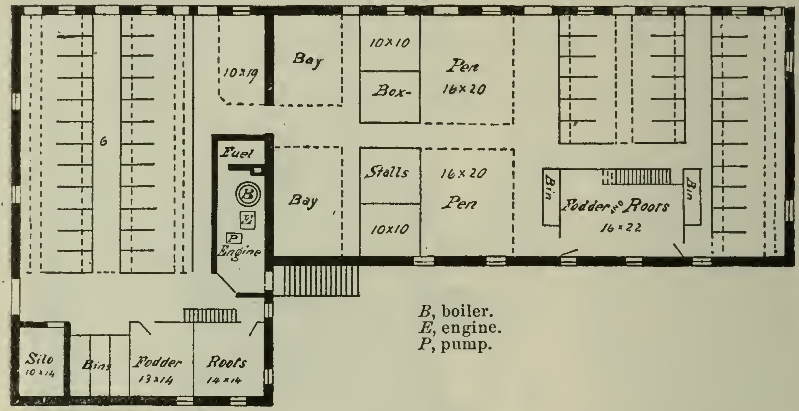
AGRICULTURAL COLLEGE BARN.

The old part of the barn is 97x48 feet, the new experimental portion 76x48 feet —outside measurement in both cases. The building is of Manhattan limestone, put up in the best style of rubble work; all the arches of the doors and windows, all jambs, and, with the exception of one door in the upper story, all sills, are of cut stone. A basement 9 feet 6 inches in height underlies the entire building. The upper story is 16 feet high, measuring to the top of the walls.

The barnyard has an unobstructed eastern exposure—an advantage which will be recognized by practical men. An abundant supply of excellent water may be had in this yard by digging to the depth of ten feet or less; and within five rods of the barnyard a perennial stream of spring water flows.

The writer is indebted to the professional skill of Prof. J. D. Walters, of the Department of Industrial Art, for the sketch from which the cut of the elevation and ground floor and basement plans referred to in this article have been made, as well as for the drawings and specifications of the recently-constructed portion of the building; and for constant interest and oversight during the process of its construction.

BASEMENT PLAN.



B, boiler.
E, engine.
P, pump.

The basement of a farm barn, when properly constructed, is by far the most important and useful part of the structure; but when badly constructed, and especially when ill ventilated and deficient in light, the basement is simply a pestilent, disease-breeding hole. All the objections to the basement are associated in some way with absence of good air and light; with these provided, all objections to the basement vanish. It is the most comfortable part of the barn to man and beast, and, under most circumstances, the portion costing least in construction, and that part of the building where animals are cared for with the least expenditure of labor.

WINDOWS AND VENTILATORS.

The above plan shows in very full detail the arrangement of the basement of the College barn. The great number of the windows and doors—the former indicated by blank spaces in the wall, the latter by the blank spaces divided longitudinally by a line—sufficiently attest the thorough lighting, and, to some extent, show the ventilation of this part. The windows are for the most part half sashes of usual size, hinged at the top so as to permit opening at will. Six ventilators—marked *V* in the plan of ground floor—establish a direct connection between the basement and outer air through cupolas on the roof. These ventilating shafts are made of inch flooring, with supporting joists at the corners; their sides are provided in suitable places with trap doors, through which hay or other fodder may be pitched to the basement. Being 3½ feet on a side where they penetrate the ground floor, and 3 feet square at their upper extremities, these ventilators admit the passage of fodder without ever obstructing.

CATTLE STALLS.

The barn furnishes stall room wholly in the basement for fifty-one head of cattle, which might easily be increased nearly one half by the construction of stalls in the spaces marked "pen" and "bay." Each stall is 4x8 feet, including the manger, 2 feet wide. At the rear of the stall is a manure gutter 6 inches deep and 20 inches wide, and beyond the gutter in the single tier of stalls is a passage-way 2 feet wide, on a level with the general floor. The mangers in all except box stalls consist of simply a foot-wide two-inch plank resting edgewise on the floor. This plank slides in cleats in the partitions, and these may be so adjusted that the space between the front of the manger and the gutter may be increased or diminished to suit the length of the animal using the stall. The grain boxes are made by simple partitions in the general manger. The stall partition next the alleys—the front of the manger—are not vertical, but slope toward the alley, 18 inches out of the perpendicular; by which arrangement waste by animals while eating is largely prevented, the feed being caught as it falls from the mouths of the cattle and returned down the sloping partition to the manger. The box-stalls are 10x10, as shown in the engravings—a satisfactory size, in our experience, although a space of 8 or 9 feet by 10 feet would answer nearly or quite as well. The space marked "fodder" and "roots," if too great for the purpose suggested, may be partitioned and used as a box-stall or as storage room for calves.

FEED BINS.

The feed bins, five in number, are usually 3x12 feet. They are supported two feet from the floor, and have sloping bottoms, so that the feed slides readily to the front, where it is drawn out through a spout. Each bin communicates with the upper story by a hinged trap door set into the floor.

SILO, FODDER AND ROOT STORAGE ROOMS.

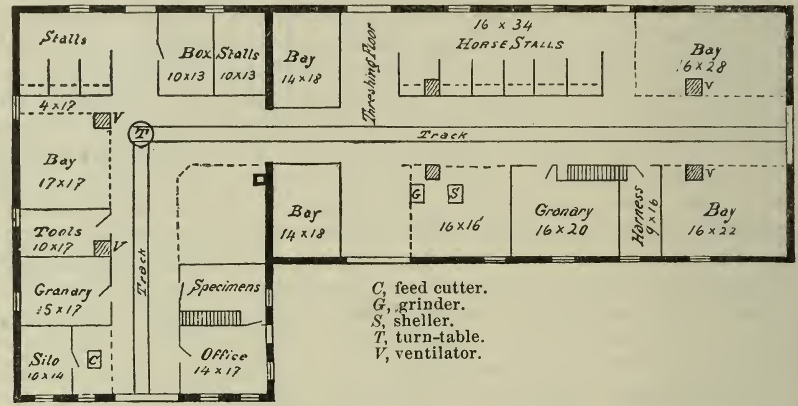
The considerable space given for the storage of fodder and roots may be used for other purposes than those named—as a hospital or as box stalls or calf pens, for example—but in experimental work, these apartments will be found to be useful as storage rooms for specially prepared fodder and roots. The silo has for its walls solid masonry, well pointed, extending upwards to the main floor. The arrangement of the silo, feed bins, fodder and root storage rooms, with reference to convenience in feeding, has proved altogether satisfactory.

ENGINE AND FUEL ROOMS.

As a precaution against accidents from fire, the engine and fuel rooms have walls of masonry, as indicated in the plan. The fuel room is also partitioned off from the engine room by a stone wall. The total space given to the engine and its fuel supply room is 9x28 feet. The boiler and engine in use are of the vertical type, of nominal ten-horse power. The floor of the engine room is laid with dressed flagging stone, as is the main aisle in front of the feed bins and silo, and the alley extending past the engine room to the door at the rear. The space marked 10x19 at the rear of the fuel room is used for steaming and in other ways preparing experimental foods for pigs. A steam pipe from the boiler and a cold-water pipe lead to the steaming tank here located.

Outside of the matters of light and ventilation, the following are the considera tions which have most influenced the arrangement of the basement: To place those parts in close proximity which are likely to be used in connection; as, for example, all space used for the storage of feed and the stalls in which the animals are fed; to place all stalls and tiers of stalls in direct communication with the barn-yard, thereby giving ease of access and quick and easy riddance of manure. The hay bays extending to the basement floor have proved most useful: they are filled with the least possible labor from the floor above, and are very easily emptied in the process of feeding.

GROUND FLOOR PLAN.



C, feed cutter.
G, grinder.
S, sheller.
T, turn-table.
V, ventilator.

The main floor is about two feet above the ground-level, and entrance is gained to it at the south end and west side of the old portion of the barn, and at the west end of the new portion, as shown in the plan. Earth embankments lead directly to the door-ways. These door-ways are 12 feet in width, and the main floors 13½ feet — a space which ordinarily might be reduced one foot without lessening the usefulness of the barn.

MOW ROOM.

The bays, with all the space over office, stalls, tool-rooms, silo and granaries, give the general storage room of the barn for hay and other fodder. This great area has been largely increased by flooring over a good part of the main gangway.

STALLS.

The horse stalls occupy a space 16x34 feet in the old portion of the barn, while in the newer portion three stalls occupy a space rather more than 13x17 feet. Each stall in the old barn is 5x9 feet, including manger and excluding the alley 7 feet wide at the rear. In the new barn, the width of the stalls is 4 feet. At the end of the stalls is a blind gutter beneath the floor, and covered by a plank on a level with it, which carries the liquid excreted to the drain at the rear of the cattle stalls in the basement.

OFFICE AND SPECIMEN ROOM.

In the office the records of the farm are kept. It is furnished with secretary and suitable chairs, and other like furniture. The specimen room is designed as a secure place for the storage of specimens of farm and experimental crops. It is provided with suitable shelving and vermin-proof granaries. The blank space at the rear of the specimen room may, as convenience dictates, be used as a storage room for implements and machines, or it may be made to do service as a bay for hay, or grain in the straw.

WATER SUPPLY.

The pump in the engine room is connected by an inch-and-one-half iron pipe with a never-failing well, located about 300 feet to the rear of the barn. It also connects, in like manner, with two cisterns, having a joint capacity of 350 barrels, which are located at either side of the main entrance to the newer portion of the barn. These cisterns are filled from the roof of the barn. From the pump, one pipe leads to the tank which supplies the boiler, and another to a 40-barrel reservoir, which is supported by the roof trusses at a point near the roof in the central part of the new barn. A steam pipe conveys steam from the boiler to this reservoir, by which means its contents may be raised to any desired temperature. From the reservoir, pipes lead to different parts of the barn, supplying stock with water, and water for cleansing purposes, as needed.

Upon the track indicated in the cut, moves a car, having flanged wheels of the usual form. This track leads to the corn-cribs, located south of the barn, and upon it grain and hay are conveniently shifted.

The above description is perhaps sufficiently detailed for the purpose of most readers. A really useful barn is a thing of growth and amplification, however carefully it may have been planned and arranged; and it is more than probable that the future will suggest changes in the details of this structure, although its general arrangement has so far proved entirely satisfactory.

A piggery for experiments built of stone, 42x24 feet, inside measurement, having ten pens separated longitudinally by a four-foot alley, is now in process of construction at a point east of the new barn and at right angles to it. The south wall of this piggery forms the north wall of a shed, 42x20 feet, also under contract, which will be built the coming summer for the further protection of the barnyard. This shed will have a hay loft throughout its entire length, the floor of the loft being continuous with the threshing-floor of the barn.

CORN MEAL AND CORN-AND-COB MEAL FOR BEEF-MAKING.

The experiment hereinafter detailed is a repetition of the one with fattening steers made at this College in the winter of 1883–84. As may be inferred from the heading, the question under examination in each instance was the relative values of clear corn meal and meal made by grinding corn with the supporting cob: using both as feed for steers uniform in age, quality, and general condition.

The abundant corn crops of the past two or three years in Kansas, and generally throughout the Union, and the steadily narrowing margin of profits in feeding, due to a variety of causes, have compelled the practice of the most economical methods in feeding; and thus an increasing public interest in the question involved in this experiment is noticeable. No better evidence of this fact is needed than that furnished by the great number and variety of corn crushers and farm mills adapted to reducing ear-corn, many of which have attained to a wide and apparently enduring popularity. The principal reason for the very varied opinions current among farmers and stockmen as to the value of ground ear-corn, is the difference in the methods of operating these farm mills. Thus, a considerable stock-raiser who complained that he got but little if any gain from grinding, I found, on examination, did not grind in any proper sense; the feed, as it escaped from the mill, was simply a mass of broken cobs and shelled corn, only an occasional kernel of the corn having been cracked, while the broken pieces of cob averaged half an inch on a side. Another feeder, who was pronounced in his views of the great advantages of grinding, reduced the whole ear to a condition of coarse but homogeneous powder. These men had a common name for two very different foods, and this difference in the condition of the grain used by them explains the difference in their estimates of its value. In some such way as this, nearly all of the widely-differing interpretations of the same experience had by different farmers is to be explained.

For the purposes of this experiment, ten steers, "two years old past," were selected in October, 1884. They were a well-grown, very smooth, and tolerably uniform lot, showing Shorthorn blood quite unmistakably. Any judge would at a glance credit them with at least one-half of improved Shorthorn blood. No difficulty was experienced in separating the ten into two sets of five each, each set having nearly equal proportions of large and small cattle, and good and indifferent feeders. The lot was well suited to the object in view, having been raised by the same individual, under precisely the same conditions. The only objection that could reasonably be urged against them was that perhaps they were in rather better condition at the beginning than was desirable, where, as in this case, the effect of food during the entire process of fattening was sought.

The steers were tied up about the middle of November; and until November 26th —when the experiment really began—they were gradually accustomed to the full feed of grain, which they received during the entire period of the experiment. They were fed in the shed occupied the previous year by the experimental steers referred to in my report for 1884, each animal occupying a numbered stall 4 feet in width. During this probationary period, the amount of fodder used was as steadily reduced as the grain ration was increased, until about the average minimum quantity required by all was reached. The object in this was to cut off any error liable to arise from feeding a variable fodder ration. That this practice did not result in another error, growing out of the artificial condition under which the steers were placed, seems to be shown by the quite common understanding among Western feeders, that the best results in full feeding are obtained with the smallest consumption of fodder.

The steers, numbered from 1 to 5 inclusive, received, besides the small daily fodder ration (averaging 8 to 12 pounds) of grain, corn-and-cob meal exclusively; while the second set, numbered 6 to 10 inclusive, were fed, besides the fodder ration, corn meal *ad libitum*. All were fed regularly about 8 A. M. and 4 P. M., and all were watered just before the afternoon feeding. Thus, it will be seen, the only variation in the treatment of the two sets was that made in the character of the grain fed, one lot receiving corn ground with its cob, the other shelled corn reduced to the condition of a coarse meal, or "chop." The experiment was carried on during a period of five months, or, to be accurate, exactly 150 days. The steers were weighed just at the expiration of every ten days of the experiment, and every feed of grain was accurately weighed and recorded.

The only break in the history of this experiment was caused by the loss of the records of the third period, and our inability to weigh the animals at the beginning of the fifth period, caused by an accident to the scales. The absence of data for the third period works a serious injury to the experiment, as it introduces one of the "guesses" which it is the prime object of experiment to remove. The failure to weigh the steers at the beginning of the fifth period is a much less serious matter. The reader will understand, from this explanation, that the totals of food consumed are really short of the true amount by one fifteenth, approximately. This hiatus in the records, unfortunate as it is, does not, however, materially affect results where comparisons of those obtained in the two sets are made, as the loss was nearly equal in the two series.

The following tables give those facts of the experiment which are susceptible of statistical statement. In all cases, the figures standing for weights refer to pounds and decimals thereof. Where the minus sign (—) precedes a number, a loss is indicated. Those who may wish to compare the facts of this feeding experiment with results obtained in the like one made a year before, can find a full statement of the latter, beginning on page 101 of this volume.

TABLE NO. I.

Weight of each steer each period (10 days) of the experiment, with totals and averages.

PERIODS OF EXPERIMENT.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
Nov. 16, begin. of experim't.	1,010	1,055	1,290	1,080	1,205	980	1,300	1,105	1,070	1,295
Dec. 6, first period	1,000	1,050	1,280	1,070	1,200	1,000	1,280	1,100	1,060	1,280
Dec. 16, second period*	....	....	....	....	....	....	....	....	....	....
Dec. 26, third period	1,050	1,050	1,395	1,080	1,250	1,060	1,320	1,140	1,110	1,340
Jan. 5, fourth period	1,060	1,050	1,420	1,130	1,270	1,050	1,360	1,130	1,110	1,330
Jan. 15, fifth period†	....	....	....	....	....	....	....	....	....	....
Jan. 25, sixth period	1,100	1,060	1,470	1,140	1,290	1,130	1,410	1,210	1,160	1,400
Feb. 4, seventh period	1,100	1,090	1,470	1,150	1,330	1,140	1,420	1,200	1,170	1,370
Feb. 14, eighth period	1,120	1,110	1,500	1,170	1,330	1,140	1,450	1,180	1,190	1,390
Feb. 24, ninth period	1,120	1,125	1,530	1,180	1,350	1,160	1,450	1,205	1,200	1,425
March 6, tenth period	1,130	1,150	1,540	1,200	1,350	1,170	1,440	1,200	1,200	1,410
March 16, eleventh period	1,150	1,165	1,560	1,220	1,365	1,180	1,450	1,210	1,220	1,430
March 26, twelfth period	1,165	1,175	1,570	1,210	1,345	1,175	1,470	1,225	1,235	1,420
April 5, thirteenth period	1,170	1,180	1,580	1,230	1,400	1,205	1,500	1,250	1,250	1,450
April 15, fourteenth period.	1,180	1,195	1,620	1,240	1,410	1,225	1,520	1,270	1,260	1,465
April 25, fifteenth period	1,200	1,210	1,625	1,230	1,400	1,240	1,530	1,315	1,270	1,480
Gain per cwt	18.8	14.7	26.0	13.9	16.2	26.6	17.6	19.0	18.7	14.3

Average gain per cwt., corn-and-cob meal, 18.2; corn meal, 18.9.

* By an unfortunate accident the paper containing weighings at the end of the second period, and the weights of feed for third period, were lost.

†An accident to the scales prevented weighing the steers at the end of fifth period.

TABLE NO. II.

The amount of feed, in pounds, consumed by each steer each period, (10 days,) and the total amount of feed.

PERIODS.	FEED — CORN-AND-COB MEAL.					FEED — CORN MEAL.				
	No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
First period	119	155	162	151	157	134	119	165	121	124
Second period	192	161	190	175	182	161	177	181	171	188
Third period	....	....	....	....	....	....	....	....	....	....
Fourth period	145	147	220	150	182	180	199	169	180	206
Fifth period	180	131	220	168	180	164	200	156	180	158
Sixth period	188	167	219	173	180	179	198	179	186	151
Seventh period	173	167	234	182	195	180	215	153	181	137
Eighth period	200	159	241	191	201	181	221	93	190	203
Ninth period	186	160	233	183	191	179	207	136	170	198
Tenth period	179	174	211	185	193	180	209	142	198	211
Eleventh period	180	178	194	180	200	180	220	142	200	174
Twelfth period	180	135	238	180	200	180	220	171	200	199
Thirteenth period	178	153	222	171	190	180	229	172	208	196
Fourteenth period	200	177	238	182	199	188	240	176	201	191
Fifteenth period	200	180	234	199	198	200	240	181	197	159
Feed consumed by each steer	2,500	2,244	3,056	2,470	2,648	2,466	2,894	2,216	2,583	2,495

Feed consumed: Corn-and-cob meal, 12,918 lbs.; corn meal, 12,654 lbs.

TABLE NO. III.

The actual and average gain of each steer each period (ten days) of the experiment.

PERIODS.	FEED — CORN-AND-COB MEAL.					Average gain......	FEED — CORN MEAL.					Average gain......
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.		No. 6.	No. 7.	No. 8.	No. 9.	No. 10.	
First period..................	—10	—5	—10	—10	—5	—8	20	—20	—5	—10	—15	—6
Second period }	50	00	115	10	50	45	60	40	40	50	60	50
Third period }												
Fourth period..............	10	00	25	50	20	21	—10	40	—10	00	—10	2
Fifth period }	40	10	50	10	20	26	80	50	80	50	70	68
Sixth period }												
Seventh period.............	00	30	00	10	40	16	10	10	—10	10	—30	—2
Eighth period...............	20	20	30	20	00	18	00	30	—20	20	20	10
Ninth period................	00	15	30	10	20	15	20	00	25	10	35	18
Tenth period................	10	25	10	20	00	13	10	—10	—5	00	—15	—4
Eleventh period...........	20	15	20	20	15	18	10	10	10	20	20	14
Twelfth period.............	15	10	10	—10	—20	1	—5	20	15	15	—10	7
Thirteenth period.........	5	5	10	20	55	19	30	30	25	15	30	26
Fourteenth period........	10	15	40	10	10	17	20	20	20	10	15	17
Fifteenth period..........	20	15	5	—10	—10	4	15	10	45	10	15	19
Total gain...............	190	155	335	150	195	....	260	230	210	200	185	....

Average gain, corn-and-cob meal, 205 lbs.; corn meal, 217 lbs.

TABLE NO. IV.

A comparison of results in the two series in definite periods of time.

PERIODS.	FEED — CORN-AND-COB MEAL.						FEED — CORN MEAL.					
	Total feed....	Total gain.....	Feed for each 1 lb. of increase........	Gain, per cwt. steer........	Average daily feed per steer.	Average daily gain per steer.........	Total feed	Total gain.....	Feed for each 1 lb. increase.	Gain per cwt. steer.........	Average daily feed per steer..	Average daily gain per steer.
1st period...	744	—40	00	00	14.8	—.80	663	—30	00	00	13.2	00
2d period....	900	225	......	3.90	18.0	2.25	878	250	......	4.30	17.5	2.50
3d period....	....		......		......		.....		......		......	
Totals & av..	....	185	....	3.20	....	1.23	....	220	....	....	....	....
4th period...	844	105	8.0	1.80	16.9	2.10	634	10	93.4	.17	18.7	.20
5th period...	879	130	13.9	2.10	17.6	1.30	858	330	5.3	5.30	17.7	3.30
6th period...	927				18.5		893				18.0	
Totals & av..	2,650	235	11.2	....	17.6	1.62	2,685	340	7.90	....	17.9	2.27
7th period...	951	80	11.9	1.30	19.0	1.60	866	—10	....	....	17.3	—.20
8th period...	992	90	11.0	1.50	19.8	1.80	888	50	17.6	.80	17.8	1.00
9th period...	953	75	12.7	1.20	19.1	1.50	890	90	9.9	1.40	17.8	1.80
Totals & av..	2,896	245	11.8	3.90	19.4	1.60	2,644	130	19.7	2.00	17.6	.87
10th period..	942	65	14.5	1.03	18.8	1.30	940	—20	....	....	18.8	—.40
11th period..	932	90	10.4	1.40	18.6	1.80	916	70	13.1	1.10	18.3	1.40
12th period..	933	5	186.6	.08	18.7	.10	970	35	27.7	.54	19.4	.70
Totals & av..	2,807	160	17.5	2.50	18.7	1.10	2,826	85	33.0	1.30	18.8	.60
13th period..	914	95	9.6	1.50	18.3	1.90	985	130	7.6	2.00	19.7	2.60
14th period..	996	85	11.7	1.30	19.9	1.70	996	85	11.7	1.30	19.9	1.70
15th period..	1,011	20	50.5	.30	20.2	.40	977	95	10.3	1.40	19.5	1.90
Totals & av..	2,921	200	14.1	3.00	19.5	1.30	2,958	310	9.5	4.60	19.7	2.10

The summary given below will be found convenient in making a direct comparison of the results obtained in this feeding experiment. These results are stated in pounds and decimal of pounds in all cases:

Feed.	Total feed......	Total gain......	Meal consumed for each 1 lb. of increase...	Average daily feed........	Average daily gain of each steer..........	Gain per cwt. of each steer....	Average gain...
Steers Nos. 1, 2, 3, 4, and 5—Feed, corn-and-cob meal..	12,918	1,025	12.60	17.2	1.36	18.2	205
Steers Nos. 6, 7, 8, 9, and 10—Feed, corn meal..	12,654	1,085	11.66	16.9	1.44	18.9	217

The most noticeable fact shown by this summary, and the tables on which it is based. is the near likeness of the two sets of feeding animals in every one of the particulars named. The two sets consumed almost identical amounts, the one of corn-and-cob meal, and the other of clear corn meal; the average daily gain per steer. as well as the gain per cwt., were nearly equal amounts in the two series. When we come to the practically interesting question of the cost in feed of making a pound of beef, we find that, while the difference in the two series is still not great, it is in favor of the five steers to which the corn meal was fed, the difference amounting to rather more than thirteen per cent. The loss of the figures for the third week detracts somewhat from the accuracy of a part of the results stated in this summary; for, while the total gain is correctly stated, the amount of feed consumed in this time can only be "guessed." That the ground cob was really useful in flesh production, may easily be shown. If we subtract the amount of cob (18 per cent.) contained in the corn-and-cob meal fed, we have 10,593 pounds of corn meal as the total feed of the first series; this, divided by the pounds of feed yielding a pound of increase in the second (corn-fed) series, gives 908 pounds as the meat product of the corn, and 117 (1,025—908) pounds as the yield of the 2,325 pounds of ground cob fed.

That the corn-and-cob meal shows to less advantage than in the experiment made the year previous, which showed "that a pound of corn cob when ground and fed to steers with the corn on which it grew is worth more than a pound of meal made from corn alone," is true; but it seems to me plain that the facts of this experiment, without much assumption, furnish the reasons for this difference in results obtained. The winter in which this feeding experiment was made was one of unparalleled length and severity, in Kansas, and during such cold weather the oleaginous and starchy corn meal would much more certainly supply the lost animal heat, and leave a larger residuüm of force for flesh development than the corn-and-cob meal. We get a hint of this from the fact that during the severest weather experienced in the course of the experiment—the 2d, 3d, and 5th and 6th periods—the gain made by the corn-and-cob-fed steers fell short of the gain made by the corn-fed steers in the amount of forty-seven pounds.

The difference in the character and condition of the steers used in the two experiments doubtless also had something to do with this discrepancy in the results obtained. The steers of 1883–84 were a thin, half-grown lot of "natives," while those in use in 1884–85 were high-grade Shorthorns, mature and full-fleshed at the start. The "gain" made by the thin lot necessarily consisted, besides beef, largely of growth in bone and the coarser parts, and towards these elements of growth the ground cob would be likely, on general principles, to make large contributions. The well-grown and well-bred steers in use during our latest trial, on the other hand, made their increase largely in fat and flesh, and all experience shows the superior excellence of corn, when used for fattening animals.

A considerable general experience in the use of corn-and-cob meal as feed for a herd of 60-odd head of neat cattle has greatly strengthened, not only the writer, but those having the practical management of the herd, in the conviction of the superior value of corn-and-cob meal. The corn-and-cob meal was, apparently at least, better digested than was clear corn alone when used; it was eaten certainly with as great relish; the cattle were "off their feed" less often; while cases of diarrhea caused by overfeeding—all too common when corn meal was used—were practically unknown when the grain fed was the ground ear-corn.

PRACTICAL OBJECTIONS.

The objections to the use of the ground ears as feed are, in my experience, wholly connected with the mechanical operation of grinding. Within the past two years we have used five different mills — three sweep mills having slow motion and operated by horse power, and two mills the grinding surface of which was chilled-iron plates, operated by steam power, and having a high rate of speed. All came to us recommended especially for their great usefulness in grinding ear-corn. I feel amply qualified to speak positively in this matter of grinding ear-corn, having investigated the subject persistently and thoroughly, and at a considerable expense, and have no hesitation in saying that all of our attempts in this direction have ended in failure more or less complete. Not one of the five mills that have been in use upon the College farm has been nearly satisfactory where the attempt was made to reduce the ears to the condition of a "chop" of even moderate fineness. The record of the operation of these mills may be given in a line: Their performances were quite variable; their ability to grind shelled corn was anywhere from three to six times greater than their capacity for the reduction of corn in the ear. A recent performance of one of these mills illustrates quite well our general experience with these machines. This mill was operated by a line of shafting connected directly with an engine of nominal ten-horse power. The engine took steam of 65 pounds pressure. The mill on this occasion was fed as nearly as possible its full capacity of ear-corn without crowding. At the end of twenty minutes, the product was found to be exactly 77 pounds, or at the rate of 231 pounds per hour. But that this low rate even could not have been long maintained, was shown by the fact that the crusher and grinding plates, at the end of twenty minutes, had become so greatly heated that a stop would have been inevitable before much more work had been done. After the mill had cooled, it was again put in motion, and for twenty minutes the same power shelled the corn, fanned the grain, after separating it from the cobs, elevated the corn to the mill; grinding at this time exactly 200 pounds to the condition of a fine chop, and doing the work with very much less of strain upon the machinery than was involved in the grinding of the 77 pounds of ear-corn.

The lesson of all this to us is, that until we can find a machine that will economically reduce ear-corn to the condition of a fine meal, we shall certainly use the clear corn meal as stock food; but when the right mill is found, I am equally confident that we shall use corn-and-cob meal.

COOKED AND RAW CORN AS FOOD FOR FATTENING PIGS.

The value of cooked corn as compared with corn in the raw state, was the subject of the experiment hereinafter detailed. Ten pigs, with one exception yearlings, were selected for the purposes of this experiment. As a whole, the lot thus employed was very uniform, the only exceptions being the occupants of pens Nos. 8 and 10. No. 8 was a six-months-old pig which refused to take kindly to the exclusive corn diet, and consequently was early counted out of the trial. No. 10, the other exception to the rule of uniformity, differed from his companions in that he was a purely-bred Poland-China, and one of superior feeding character, the others being purely-bred and closely-related Berkshires. The behavior of the young pig, No. 8, was interesting, because it seems to illustrate a truth of quite general application. This pig, almost from the first, showed a quite variable appetite; he was often troubled with constipation, and had the dry coat and unthrifty appearance which careful managers everywhere strive to avoid in their stock. This case is one of many that have come under my observation in the course of twelve years' experience upon the College farm, all serving to emphasize what I believe to be the fact, namely, that valuable, unexcelled I may say, as corn is, as an easily-accessible fattening food for mature animals, it is for young growing pigs literally a starvation diet.

These pigs were fed twice daily with general regularity at 8 A. M. and 4 P. M. All were weighed at the end of each ten days, and a careful record made of all weighings. The pigs occupying pens 1 to 5, inclusive, were fed cooked shelled corn; those in pens 6 to 10 received raw shelled corn — as much in both series being fed as was consumed without waste. The figures for cooked corn given in the tables which follow in every case refer to the weight of the corn before cooking. The corn was weighed before cooking and after, and the proportion of water absorbed in the cooking process subtracted in the case of every feed of every pig. The comparisons, therefore, wherever made, are of cooked corn, weighed before it was cooked, with raw corn simply. In cooking, no set rule was followed, except that the corn was so thoroughly acted upon by the heat that each grain might easily be crushed between the thumb and finger. The cooking was done in an ordinary barrel, which was connected with a steam boiler by a half-inch steam pipe, which supplied the barrel with steam at a boiler pressure varying from 30 to 60 pounds to the square inch. Water directly from the well was given daily to each pig as was required.

Almost from the first a considerable practical difficulty was experienced in feeding the cooked corn, but one which of course would be felt in feeding any form of soft feed: During very cold weather, of which much was experienced, the soft, mushy, cooked corn, unless consumed as soon as placed in the trough, would freeze solidly, entailing considerable waste at times. This difficulty was aggravated by the well-known fact that full-fed pigs eat slowly in times of severe cold. On this account it was found occasionally necessary to substitute a small feed of raw corn for the regular ration of cooked corn; but it is believed that this was not done often enough to affect the "totals and averages" obtained in this experiment.

In the following tables the principal facts in regard to feed and gain in each pen are given. The blank results given for the fourth period in table No. 2 are explained by the fact that a terrific "blizzard," which made weighing impossible, prevailed when this operation was to have been performed. The minus sign before the numbers in table No. 2 indicates a loss:

TABLE NO. I.

Showing amount of feed consumed each period in each pen, and total feed.

PERIODS.	FEED—COOKED SHELLED CORN.					FEED—RAW SHELLED CORN.			
	Pen 1.	*Pen 2.*	*Pen 3.*	*Pen 4.*	*Pen 5.*	*Pen 6.*	*Pen 7.*	*Pen 9.*	*Pen 10.*
First period	69	67	67	64	62	105	104	89	102
Second period	112	113	108	105	105	122	117	116	120
Third period	149	143	148	129	138	137	132	132	126
Fourth period	105	104	106	97	95	125	124	116	101
Fifth period	110	104	105	93	101	117	115	104	112
Sixth period	75	75	75	62	69	107	113	101	104
Seventh period	66	62	75	64	61	96	95	92	85
Eighth period	67	63	68	62	62	100	100	89	90
Ninth period	58	58	67	53	53	88	85	74	76
Total feed consumed in each pen	811	789	819	729	746	997	985	913	916

Average feed consumed in each pen: cooked shelled corn, 778.8 lbs.; raw shelled corn, 952.5 lbs.

TABLE NO. II.

Showing gain of each pig during each period of experiment.

PERIODS.	FEED—COOKED SHELLED CORN.					FEED—RAW SHELLED CORN.			
	Pen 1.	*Pen 2.*	*Pen 3.*	*Pen 4.*	*Pen 5.*	*Pen 6.*	*Pen 7.*	*Pen 9.*	*Pen 10.*
First period	4	23	8	—7	7	8	12	12	6
Second period	31	8	21	49	9	55	22	34	55
Third period	5	11	10	28	36	57	61	7	23
Fourth period	....	....	....	....	....	....	....	....	....
Fifth period	23	15	13	7	00	20	15	15	16
Sixth period	00	8	14	—5	00	20	15	7	12
Seventh period	29	19	26	24	9	16	6	—15	12
Eighth period	—5	22	14	14	21	16	5	17	7
Ninth period	18	1	3	2	5	18	9	16	16
Total gain in each pen	105	107	109	112	87	220	115	123	147

Average gain in each pen: cooked shelled corn, 104 lbs.; raw shelled corn, 151 lbs.

TABLE NO. III.

The results obtained with each pig, in pounds, together with the total and average results.

NO. OF PEN.	*Weight of each pig at beginning of experiment*	*Weight of each pig at end of experiment*	*Gain*	*Gain per cwt. of each pig*	*Feed consumed, pounds.*		*Feed, pounds consumed for each cwt. of pork.*		*Feed, pounds, for one pound of increase.*	
					Cooked corn	Raw corn	Cooked corn	Raw corn	Cooked corn	Raw corn
	FEED—COOKED CORN.									
1	260	365	105	40.3	811.0	....	259.0	....	7.72	....
2	223	330	107	47.9	789.0	....	285.0	....	7.37	....
3	246	355	109	44.3	819.0	....	272.0	....	7.51	....
4	178	290	112	63.4	729.0	....	309.0	....	6.50	....
5	188	275	87	46.2	746.0	....	322.0	....	8.57	....
Totals	....	....	520	....	3,894.0	....	....	....	....	....
Averages	219	323	104	47.4	778.8	....	289.7	....	7.48	....
	FEED—RAW CORN.									
6	260.0	470.0	210.0	80.7	....	997.0	....	273	....	4.75
7	300.0	415.0	115.0	38.3	....	985.0	....	275	....	8.57
8	....	....	....	....	....	....	....	....	....	....
9	217.0	340.0	123.0	56.6	....	913.0	....	328	....	7.42
10	233.0	380.0	147.0	63.1	....	916.0	....	299	....	6.23
Totals	....	....	....	....	....	3,811.0	....	....	....	....
Averages	252.5	401.3	148.8	59.7	....	952.8	....	296	....	6.40

TABLE NO. IV.

The results obtained by periods in both series, together with the total and average results.

PERIODS.	FEED—COOKED CORN. *Pens 1, 2, 3, 4 and 5.*					FEED—RAW CORN. *Pens 6, 7, 9 and 10.*				
	Average weight of pigs.........	*Feed, lbs.........*	*Gain, lbs.........*	*Gain, lbs., per cwt. of pig.........*	*Feed, lbs., for 1 lb. of increase.........*	*Average weight of pigs.........*	*Feed, lbs.........*	*Gain, lbs.........*	*Gain, lbs., per cwt. of pig.........*	*Feed, lbs., for 1 lb. increase.........*
December 18th, end first period......	226	329	35	3.19	9.4	262	400	38	3.61	10.5
December 28th, end second period..	260	543	118	9.07	4.6	304	475	166	1.36	2.9
January 7th, end third period........	278	707	90	6.47	7.8	341	527	148	10.85	4.2
January 17th, end fourth period....	....	507	....	....	....	....	466	....	....	....
January 27th, end fifth period.......	289	513	58	4.01	8.8	357	448	66	4.61	6.8
February 6th, end sixth period......	292	356	17	1.16	20.8	363	425	24	1.65	17.5
February 16th, end seventh period..	313	328	107	6.84	3.06	375	368	49	3.26	8.7
February 26th, end eighth period...	326	322	66	4.04	4.9	388	279	45	2.89	6.2
March 8th, end ninth period	332	289	29	1.75	9.6	403	323	59	3.66	5.5
Totals....................................	....	3,894	520	....	....	....	3,811	605	....	....
Averages..................................	....	432.6	57.7	47.5	7.5	....	423	67.2	59.8	6.3

For convenience in making a comparison of results, the following summary, giving the principal facts of the foregoing tables, with others, in concise form, has been arranged:

Feed.	*Total feed.........*	*Total gain.........*	*Feed consumed for each lb. of increase..*	*Average daily feed of each pig.........*	*Average daily gain of each pig.........*	*Gain per cwt. of each pig.........*	*Averagegain per pig.........*
Feed, cooked corn; pigs Nos. 1, 2, 3, 4 and 5.................	3,894	520	7.5	8.60	1.10	47.5	104
Feed, raw corn; pigs 6, 7, 9 and 10...............................	3,811	605	6.3	10.50	1.68	59.8	151

Some of the difficulties encountered in the prosecution of this experiment have already been referred to. The cold weather which prevailed during the last four weeks of the trial furnished many annoying interruptions. During periods of severe cold near the close of the experiment, the pigs remained in an almost comatose condition, coming to their feed with evident reluctance, consuming but little, and making a proportionally light gain. While the cold weather affected all the pigs alike, so far as relates to externals, the character of the cooked feed — its liability to freeze as soon as placed in the trough — made it extremely difficult to keep accurately the record of feed consumed. Nevertheless it is believed that the errors thus originating were not sufficient to affect the results obtained. I expect in the near future to repeat, under more favorable circumstances, the experiment above detailed.

The figures given above need but little comment. They show as conclusively as figures can show anything, that the cooked corn was less useful than the raw grain, the difference in favor of the uncooked corn taking the item of pounds of feed required to make one pound of increase, amounting to exactly one-fifth. That this result is not an accident, seems abundantly proved by the other items of the summary: the daily consumption of each pig using cooked feed was almost exactly the same as the amount of raw corn used in the pens where raw corn was the exclusive food, but the average daily gain — and of course the total gain — and the gain per hundred weight of pig were in the series using the cooked feed, greatly less than with the pigs using the raw corn. Such an entire unanimity of results can only be explained upon the theory that the cooking was an injurious process so far as its use as food for fattening animals is concerned. With younger animals, whose gain would be made chiefly in growth, the cooked feed might give different results from the foregoing; but a considerable general experience does not encourage this belief.

Nothing has been said here of the cost of cooking—always a very considerable item, both in respect to labor and cost of fuel—as circumstances, such as mechanical conveniences and cost of labor and fuel, vary greatly the cost of the process in different localities.

PORK FROM THE PASTURE FIELD.

In the early spring of 1885, a rich and productive acre and a half of the meadow embraced within the limits of field No. 6 was fenced with the object of ascertaining of the value of orchard-grass particularly, as summer pasturage for hogs. About one-fourth of an acre of this piece of ground was very completely occupied by alfalfa, the remainder being orchard-grass with a slight admixture of red clover and alfalfa, all making a very compact, thick-set sward.

On May 11th eight vigorous, eight-months-old shoats were given possession of this inclosure. The alfalfa at this time was about one foot tall and the orchard-grass considerably shorter; but every foot of the acre was occupied by a dense growth of succulent vegetation. These pigs had ranged the cattle yards during the winter, and as the result of "following" corn-fed cattle were thick fleshed—almost "fat." The weight of the lot at the beginning of the experiment was 1,522 lbs., an average of nearly 190 lbs. per pig.

Until June 6th the pigs depended wholly on the herbage furnished by the acre, they meanwhile giving evidences of discontent by frequent squealings, and showing by the rapid skrinkage of their forms that their grievances were real. On June 6th the scales showed the lot to weigh 1,370 lbs., a loss in twenty-five days of 152 lbs. Evidently, grass and alfalfa alone would keep pigs alive, but it would not hold flesh, at least flesh made from corn. It was plainly evident, too, that the grass diet must be supplemented with grain in some form, to prevent a further and more rapid falling away. From June 6th to the end of the season, two pounds of ear-corn were fed daily to each pig.

The following figures show in statistical form the progress of the lot during the experiment:

May 11th, (beginning of the experiment,) weight of the eight pigs	1,522 lbs.
June 6th, weight of the eight pigs	1,370 lbs.
Loss in 26 days	152 lbs.

The pigs were next weighed July 6th, when, singularly enough, neither gain nor loss was discovered.

July 6th, the eight pigs weighed	1,370 lbs.
August 6th, they weighed	1,492 lbs.
Gain, from July 6th	122 lbs.
September 3d, the weight of the eight pigs was	1,566 lbs.
Gain, from August 6th (28 days)	74 lbs.
On October 6th, the eight pigs weighed	1,690 lbs.
Gain, from September 3d (33 days)	124 lbs.
The final weighing was made October 31st, when the lot weighed	1,710 lbs.
Gain, from October 6th (25 days)	20 lbs.

The following table gives in concise form the results of the experiment:

Periods of experiment.	*Number of pigs*	*Average weight of pigs, lbs*	*Gain, lbs*	*Total daily gain*
May 11th, beginning of the experiment	8	190	....	....
May 11th to June 6th	8	171	–152	5.85
June 6th to July 6th	8	171	....	....
July 6th to August 6th	8	186	122	3.94
August 6th to September 3d	8	196	74	2.64
September 3d to October 6th	8	211	124	3.75
October 6th to October 31st	8	213	20	.80
Totals and averages	......	....	188	1.08

Not much need be said additional to the facts given above. These show conclusively enough that this acre and a half of pasture ground was not put to profitable use when employed as hog pasture. That this lack of productiveness was due chiefly to the orchard-grass which made up the bulk of the feed, we have abundant reason for believing. The one-fourth acre of alfalfa was kept constantly cropped to a level with the ground; the same may be said of the small amount of red clover, but the orchard-grass was always luxuriant and abundant, covering the ground and rotting upon it in dense masses during the entire season. It was quite commonly remarked by visitors that this field would furnish feed for three times the number of pigs that grazed it. The pigs could not be induced to like the orchard-grass, and I am confident that whatever of gain is attributable to the green feed, should be placed to the alfalfa and clover alone. It may be said of the alfalfa of this experimental acre and a half, that, like the alfalfa used in a similar manner the year before, it was almost totally destroyed by the close cropping, only occasional plants showing life the spring following. A considerable general experience, however, has shown that alfalfa is not necessarily injured seriously by the grazing of swine. Where the range is ample, no damage to the sward outside of the narrow paths made by the pigs is likely to result during the winter months.

WARM DRINKING-WATER FOR MILCH COWS.

An interesting experiment was begun early in February, having for its object to ascertain the influence of warm water as compared with water at the ordinary temperature of wells, when used as drink for milking-cows.

Four cows, two Shorthorns and two Jerseys, were employed in this trial. These cows had been milked steadily for upwards of six months, when the experiment was begun, and of course were considerably past the period of full milking. The general plan of the experiment was to feed all of the cows food uniform in quantity and quality each day and from day to day, while giving them warm drinking-water upon alternate days, and water freshly pumped from the well at all other times. This "warm" water during the first three days of the trial was ordinary well water raised to the temperature of 80° Fahr., but after the third day water at 90° was used for two days, and from that time to the end, water at 100° was steadily used. The cows were watered at about 10 o'clock in the morning, running in the yard with the general herd during the remainder of the day. This was the general treatment when either warm or cold water was used, although at times modifications of the plan were found necessary. Thus, at the first the cows approached the warm, steaming water with great reluctance, their timidity being heightened by the unusual position in the barn, where the water was furnished. On this account it was found necessary at the first to delay watering in order that strong appetites might neutralize this natural timidity. The difficulty, however, was not lasting; after two or three trials of the warm water, a liking for it which amounted to greed was rapidly developed. The cows not merely drank the warm water without hesitation, but rushed eagerly to it and drank to repletion as soon as freed from their stalls. It seems reasonable to suppose that the effect of the drink, warm and cold, would be noticed in the milk yielded at the two successive milkings which followed the use of the particular drink. In the figures given below, therefore, the milk credited to the warm water is, in every case, the total milk yielded at the evening and morning milkings following the use of that particular drink. I have no doubt that the plan fails to show the true value of either the warm or cold drink — that, in short, the influence of the warm water extends, to some extent, beyond these two milkings, and the cold water in like manner tends to neutralize any effect the warm water may have in milk production. Be all this true, it is not clear that any other plan of operations would be open to fewer objections than the one here employed. The table which follows is a statement of results for every day of the trial:

PERIOD OF EXPERIMENT.	DAILY MILK YIELD, POUNDS.	
	Drink, warm water	*Drink, water directly from the well* ....
February 9th, (beginning of experiment)	....	74
February 10th	81	
February 11th	....	75
February 12th	86	
February 13th	....	78
February 14th	84	
February 15th	....	80
February 16th	87	
February 17th	....	81
February 18th	90	
February 19th	....	82
February 20th	90	
February 21st	....	85
February 22d	90	
February 23d	....	92
February 24th	89	
February 25th	....	75
February 26th	89	
February 27th	....	81
February 28th	85	
Totals	871	803

Total increase in milk while warm water was used, 68 pounds.
Total increase per cent. in milk while warm water was used, 8.47.

While this experiment, from its brevity and the peculiar circumstances surrounding it, is far from conclusive upon the point under examination, it certainly is suggestive of great value. The fact that every day except one when warm water was the drink of the cows, a marked increase in the flow of milk was recorded — this increase amounting to fourteen and even eighteen per cent.— shows conclusively, as it seems to me, that the warm water was always beneficial. I am confident, however, that this beneficial influence is shown here at the minimum, for the reason before stated — that the influence of the warm and of the cold drink extends beyond the two milkings immediately following, and for the reason that the experiment, because of our inability to complete the steaming machinery earlier, was carried on after the winter had spent its force, during a period of warm, "open" weather.

That the loss to stock-owners from the use of water in a freezing condition in cold weather is very great, is strongly suggested by the ordinary winter experiences of the barnyard. The picture of the herd of shivering cattle standing over the trough or partly frozen stream by the half-hour, dreading the shock that the freezing water gives to the system, and after drinking shivering and shaking as if in an ague, is a familiar one to every northern stock-raiser. In striking contrast to this was the behavior of our cows after they had learned the taste of warm water; they drank it greedily in full draughts, afterward "stretching" themselves with evident comfort and satisfaction. Even the young sucking calves, which ordinarily took cold water with great reluctance if at all, rapidly acquired a taste for the warm drink, sipping it slyly as first, but soon taking it in full draughts.

This experiment seems to suggest a practically valuable use for that on every farm abundant product, woody fiber. This substance, which makes the bulk of the overripe and spoiled fodders, straw, corn-stalks and cobs, to say nothing of recognized fuel materials, is for the most part a waste upon every farm. It is doubtless useful to a limited extent in diluting concentrated foods, and in giving them the bulk needed to call into use the full powers of the digestive organs; but as a food, "that which is capable of being assimilated by an organism," woody fiber has no value. The suggestion of this experiment plainly is that this crude and worthless woody fiber, when in a suitable condition to burn, may be made, in a sense, a valuable food; supplying, directly to the animal, heat which otherwise must come from the more expensive digestible foods. The heat thus obtained must be conveyed to the animal in the water he drinks, because the large amount of water consumed daily makes it the necessary vehicle for conveying the largest possible amount of heat to the animal organism. That this is a simple and inexpensive process, may be shown by a single fact gathered from general experience: a bushel of bituminous coal burned in an economical boiler, we have found to be ample fuel for heating the daily drinking-water required by twenty-five cows.

I am unable to think of one of the "leaks of the farm" that may be so easily and with such profitable results stopped as this waste of animal heat. The general proposition that warm, comfortable quarters — not mere "shelter" — supplemented with warm food and drink, are advantageous to domesticated animals, is rarely questioned. I go a step further, and assert that the heat and comfort of animals may be conserved, in the way indicated, to the great financial advantage of their owners.

THICK SEEDING, SUBSOILING AND MANURING FOR CORN.

The experiment made in 1883, in the line suggested by the heading of this article, was repeated, in a measure, in 1884, and again in 1885.

Thirteen plats were located in field No. 1, for the purposes of this experiment. Each plat was $10\frac{1}{2}$ feet wide by $207\frac{1}{2}$ feet long, ($\frac{1}{20}$ of an acre, approximately,) and these plats were arranged and treated subsequently on the general plan employed in previous years: each plat was separated from those adjacent by unoccupied two-foot spaces, and each alternate plat throughout the system, for purposes of comparison, received no special treatment. The operations of plowing and harrowing, and all subsequent cultivation, together with the various operations of harvesting, were performed in all of the different plats at as nearly as possible the same time.

The soil of these plats was a strong, deep, and very fertile loam, overlying a clay subsoil not naturally well drained. The kind of corn used was a medium yellow dent of great productiveness.

The operation of subsoiling was performed by the ordinary subsoil plow, working at a depth of four inches in the furrow left by the ordinary plow turning a six-and-a-half-inch-deep furrow slice. The manured plats received one and a half two-horse loads — equal to thirty loads per acre — of manure, only partially rotted. The thick seeding of this experiment consisted in planting the corn in drills two and one-half feet apart (elsewhere the drills were three and a half feet apart) and doubling the ordinary amount of seed used in each drill, so that the corn plants stood five inches apart in the rows. The ordinary cultivation necessary to keep the ground properly porous and free from weeds was given all the plats.

PLAN OF THE EXPERIMENT.

SIZE OF PLATS, $\frac{1}{20}$ ACRE.

Plat A—Plowed 6½ in. Yield of 3 rows.	Corn, 277½ lbs. Stalks, 239 lbs.
Plat B—Plowed 6½ in.; subsoiled. Yield of 3 rows	Corn, 233½ lbs. Stalks, 195 lbs.
Plat C—Plowed 6½ in. Yield of 3 rows	Corn, 236 lbs. Stalks 190 lbs.
Plat D—Plowed 6½ in.; subsoiled. Yield of 3 rows	Corn, 235½ lbs. Stalks, 195 lbs.
Plat E—Plowed 6½ in. Yield of 3 rows	Corn, 219½ lbs. Stalks, 188 lbs.
Plat F—Plowed 6½ in.; manured 1½ loads. Yield of 3 rows	Corn, 230½ lbs. Stalks, 210 lbs.
Plat G—Plowed 6½ in. Yield of 3 rows	Corn, 220 lbs. Stalks, 199 lbs.
Plat H—Plowed 6½ in.; manured 1½ loads. Yield of 3 rows	Corn, 225½ lbs. Stalks, 182 lbs.
Plat I—Plowed 6½ in. Yield of 3 rows	Corn, 202½ lbs. Stalks, 148 lbs.
Plat J—Plowed 6½ in. Yield of 4 rows	Corn, 272 lbs. Stalks, 214 lbs.
Plat K—Plowed 3½ in. Yield of 3 rows	Corn, 194 lbs. Stalks, 185 lbs.
Plat L—Plowed 6½ in. Yield of 4 rows	Corn, 242½ lbs. Stalks, 211 lbs.
Plat M—Plowed 6½ in. Yield of 3 rows	Corn, 195½ lbs. Stalks, 147 lbs.

The facts of the experiment in each plat, and in the groups of plats receiving specific treatment, are given in full detail in the table and summary which follow:

Plats.	*Yield of plat, corn, lbs.....*	*Yield of plat, stalks, lbs....*	*Yield per acre, corn, bushels, (72 lbs.).....*	*Yield per acre, stalks, tons...*	*Quality of corn*
Plat A, plowed 6½ inches, 3 rows	277.5	239	77	2.39	Good.
Plat B, plowed 6½ inches, subsoiled, 3 rows	233.5	195	65	1.95	Good.
Plat C, plowed 6½ inches, 3 rows	236	190	66	1.90	Good.
Plat D, plowed 6½ inches, subsoiled, 3 rows	235.5	195	65	1.75	Good.
Plat E, plowed 6½ inches, 3 rows	219.5	188	61	1.88	Good.
Plat F, plowed 6½ inches, manured 1½ loads, 3 rows	230.5	210	64	2.10	Good.
Plat G, plowed 6½ inches, 3 rows	220	199	61	1.99	Good.
Plat H, plowed 6½ inches, manured 1½ loads, 3 rows	225.5	182	63	1.82	Good.
Plat I, plowed 6½ inches, 3 rows	202.5	148	56	1.48	Good.
Plat J, plowed 6½ inches, 4 rows	272	214	75	2.72	Poor.
Plat K, plowed 6½ inches, 3 rows	194	185	54	1.85	Good.
Plat L, plowed 6½ inches, 4 rows	242.5	211	67	2.11	Poor.
Plat M, plowed 6½ inches, 3 rows	195.5	147	54	1.47	Good.

SUMMARY.

Plats.	*Yield of plat, corn, lbs.....*	*Yield of plat, stalks, lbs....*	*Yield per acre, corn, bushels.*	*Yield per acre, stalks, tons...*
Plats B and D, plowed 6½ inches and subsoiled, 3 rows	234.5	195	65	1.95
Plats A, C and E, plowed 6½ inches, adjacent B and D, 3 rows	244.3	206	67	2.06
Plats F and H, plowed 6½ inches, manured 1½ loads each, 3 rows	228	196	63	1.96
Plats E, G and I, plowed 6½ inches, adjacent F and H, 3 rows	214	178	59	1.78
Plats J and L, plowed 6½ inches, thick seeded, 4 rows	257.2	212	71	2.12
Plats I, K and M, plowed 6½ inches, adjacent J and L, 3 rows	197.3	160	55	1.60

The subsoiling — always costly work — was of no advantage to the growing crop in this trial. The slightly diminished yield of the subsoil plats as compared with the flanking (adjacent) ones, which were simply plowed, is due to the slight variations in the soil of the plats, or, perhaps, to slight differences in the treatment given them, and not to any unfavorable influence of subsoiling. All this is strictly in line with the results obtained in the course of three years of previous experimental work, and a considerable general experience had at various times upon the College farm We have tried subsoiling during these years upon clay lands of almost every degree of fertility; upon lands that had been in cultivation a considerable number of years and with comparatively new lands; but in no case was there any considerable increase in the yield of the subsoiled plats, certainly none at all commensurate with the cost of subsoiling. All this is plainly shown by the subjoined table, which gives in compact form the results of our subsoiling of corn ground during four years:

Four years of subsoiling corn ground.		*Yield per acre, corn, bus....*	*Yield per acre, stalks, tons..*
1882—	Subsoiled plats	40	....
	Plowed plats adjacent subsoil plats	38	....
1883—	Subsoiled plats	51	1.48
	Plowed plats adjacent subsoil plats	54	1.66
1884—	Subsoil plats	64	1.77
	Plowed plats adjacent subsoil plats	62	1.42
1885—	Subsoil plats	65	1.95
	Plowed plats adjacent subsoil plats	67	2.06
Average yield of subsoiled plats, 4 years		55	1.73
Average yield of plowed plats adjacent subsoil plats, 4 years		55.25	1.71

Whether different results might have been had upon thinner soils than ours, and especially upon those soils beneath which a tenacious "hard pan" has been formed by the long-continued action of the sole of the plow, we can only conjecture. Certainly only upon such soils does the experiment of subsoiling seem worth trying. Of the total inutility of subsoiling upon the College farm as it now is, I am abundantly satisfied. As our soils do not seem likely soon to reach the "run down" condition which theoretically offers the most promising field for subsoiling, it seems likely that the work of the past year will, for the present, end subsoiling upon the College farm.

MANURING.

No considerable increase in the yield either of grain or stalks for the application of the barnyard manure is noted. This result is quite in harmony with previous experiments. In our experience, manure made during the winter months and hauled afield the following spring is rarely of much benefit to crops grown the first year after such application. The second and third years, however, have generally shown very decidedly the beneficial effects of a dressing of barnyard manure. Manuring, even when the manure costs nothing, is always an expensive operation; the true policy of Kansas farmers, therefore, is to maintain the condition of the farm by judicious cropping, thorough cultivation, and pasturing, so that general manuring may be avoided, and the annual yield of manure applied to particular crops and easily-accessible fields.

THICK SEEDING OF CORN.

Our summary shows for the plats J and L, in which four rows of corn were grown to three in other plats, each row also containing twice as many plants as were grown in the drills of all other plats, a yield of 71 bushels of shelled corn and $\frac{2}{12}$ tons of stalks per acre — a gain, as compared with the adjacent plats, planted in the ordinary way, of 16 bushels of corn and one-half ton of fodder. These figures do not nearly show the whole difference of results obtained in the two methods of planting, for the quality of the fodder was greatly improved by the thick seeding, while the quality of the corn by the same cause was considerably injured. The ears of corn obtained from the thick-seeded plats were generally small, though sound, and the proportion of "nubbins" to sound ears was great. Nevertheless, this plan of thick seeding is well worth the attention of that large number of Kansas farmers who find themselves each year obliged to look to unusual sources to supplement their ordinary fodder supply. If, as has been repeatedly shown upon the College farm, we can grow per acre at the slight cost involved in raising and harvesting this fodder crop a mass of stock food such as 65 bushels of corn and 2 tons of fodder is, then we have in the corn-plant resources of stock feed that, so far in this State, have scarcely been touched.

The necessity for greater economy and care in the harvesting and management of the fodder of corn as ordinarily grown is now strongly urged by many agricultural writers. Without doubt this is a field in which practical reform is demanded by every interest of economy. Nevertheless, it must be admitted that the fodder obtained by the ordinary methods of field culture is a coarse and not very valuable feed. The large proportion of coarse stems from which the foliaceous growth has been largely removed by the prevailing winds, the great difficulty experienced in handling and storing this bulky stover, and the great waste that always attends feeding it, are certain always to detract from the value of ordinary corn fodder. But corn thickly planted, as in our experimental plats, of necessity grows fine; the proportion of stems to leaves and foliage is greatly reduced; on this account it may be easily harvested and stored, while the waste in feeding, from its superior quality, is very light. Such fodder, when freed from the corn, is excellent for nearly all purposes for which ordinary hay is used, but when fed unhusked directly from the feed-cutter, it is an unsurpassed feed for cattle in course of preparation for the shambles.

OUR TAME GRASSES: FACTS AND OPINIONS.

It is not surprising that the early settlers of Kansas were quite indifferent to the advantages derivable from the growth of the cultivated species of grasses and clovers. Farmers rarely look beyond the immediate necessities of their situation, and the pioneers of Kansas were no exception to the general rule. They had at their doors the largest and probably the most productive natural meadows to be found on the North American continent. While sister States had been blessed with the coarser growth of trees and shrubs, Nature had made of Kansas one great hay and pasture field. Everywhere grass was abundant, so abundant as to be a constant obstacle to the farmer, and a threat to buildings and fences during all the long season when the prairie-fires pretty constantly lit up the western skies. The conservation of the native grasses and the introduction of new have never until quite recently been the purpose of Kansas farmers.

Nor is much good likely to come of any efforts that may be put forth with the object of saving the remnant of our native grasses. The grasses which compose these are, beyond a question, among the most vigorous and nutritive known. No grasses among cultivated sorts can surpass, if any can equal, them in ability to withstand insect ravages and all the peculiar exigencies of the Western climate; but in saying this, we have exhausted the list of their good qualities. On the other hand, these wild species make no growth, and consequently give no feed worth speaking of, except during the summer heats, and all, with exception of "buffalo grass," so called, are worthless, usually long before the first frosts of fall are felt. Moreover, these wild grasses will not endure close grazing or the constant tramping necessary where pasturing herds are kept within the limits of fields. For these reasons and others that might be given, our native grasses are rapidly passing away, and no hand is lifted to arrest their downfall.

THE GROWTH OF THE IDEA.

Perhaps the most encouraging fact in connection with the recent great agricultural development of the State is the gradual and successful substitution of the cultivated grasses and clovers for the failing wild grasses. For a distance of fully one hundred and fifty miles west of the Missouri river, fields of grass and clover are common, and every year adds enormously to the area thus employed. The "tame-grass question," which ten years ago was regarded by most Kansas farmers as a "question" and a "problem" of doubtful issue, is now as generally considered settled in favor of the great usefulness and entire practicability of a considerable and increasing list of grasses and clovers. That this tame-grass idea will, with the practices underlying it, get a steady expansion in the agriculture of the State, thus ridding our farms of their foulness, increasing their fertility and productiveness, and adding to their beauty, no one at all familiar with the facts can doubt.

KINDS SUITABLE AND UNSUITABLE.

The kinds of grasses and clovers grown in the latitude of Kansas east of the Missouri river may generally, but not always profitably, be grown in the same latitude west of the river. As we pass westward from the eastern boundary of the

State, the rapidly-increasing altitude and variableness of the climate are obstacles in the way of the successful cultivation of many familiar Eastern sorts; so that the facts of experience obtained along our eastern border cannot be successfully applied in the central and western portions of the State. In general, it may be said that no grass or clover can be permanently successful in Kansas that has not the ability to withstand high temperatures and drouths as well as severe freezing. Such peculiarly Southern sorts as Johnson grass and Bermuda grass are totally worthless in Kansas, because, if not wholly destroyed by the severity of our winters, they are so completely crippled as to be of no practical value. In the course of a long experience with tame grasses in Kansas, the idea has steadily grown with me that orchard-grass is generally our best and most useful grass, and that for mixed pastures and mowing ground, orchard-grass and red clover have a position in Kansas as permanent as that held by timothy and clover further east. Alfalfa is also sure to be a favorite with Kansas cultivators, although a wider experience is needed to determine accurately its place. Of the many other sorts favorably known in different localities, and which have been the subjects of persistent trial upon the College farm, not much needs to be said here. Timothy, though uncertain, frequently gives a large yield of valuable hay, but it suffers from dry weather and insects (particularly chinch-bugs), and it gives no pasturage worth mentioning. Kentucky blue-grass is a persistent grower in Kansas under almost every circumstance of climate and soil. It will in time drive almost every other sort from the soil in which it gets foothold. Despite these good qualities, it is, except for lawns, of little use to Kansas farmers. It yields no hay, of course, and the amount of pasturage yielded by it is inconsiderable. Perennial rye-grass (*Lolium perenne*), although repeatedly tried, often with good prospects of success, has, I believe, never survived the second winter. Tall meadow oat-grass (*Avena elatior*) is, on many accounts, a useful grass. It gives very early and excellent pasturage, and a stand with it is easily obtained, but the yield of hay is light and apparently not very palatable, and it suffers greatly from "dry spells." Common white clover starts early in the spring, and for a time makes abundant pasturage; but as the summer advances, it fails rapidly, frequently perishing, but reseeding and almost certainly reappearing the following spring. A stand of red-top has proved quite difficult to secure with us, doubtless on account of the smallness of its seeds. Except in swales, or other like moist situations, this is not a promising sort. Many other sorts might be referred to here, but the list given embraces nearly every kind that is likely to be the subject of trial in Kansas.

GRASS LAND — HOW PREPARED.

In our experience, the best results have been obtained with most sorts of artificial grasses upon a fertile clay loam, resting on a permeable clay subsoil. But let it be remembered, land can hardly be too rich or too highly manured for grasses. Indeed, we have found that not only are the largest yields obtained upon such fertile lands, but the effect of insect depredations is greatly lessened. Of course, comparatively poor lands, in Kansas as elsewhere, will grow grass; but poor lands produce poor crops everywhere. Better far, commence the growth of the tame species of grass before the land has become impoverished by injudicious cropping.

But whatever may be the character of the soil, prepare it as well and thoroughly, by plowing and harrowing, as for any grain crop. This is a rule with scarcely any exception; and its violation in many ways explains a large proportion of the failures that have attended the attempted cultivation of tame grasses in Kansas.

FAILURES — CAUSES AND REMEDIES.

Still failures are made in the cultivation of grasses, and often when it is not easy to name the causes. For example, a farmer writes me from a very rich agricultural section that, upon his farm, orchard-grass starts readily, and no difficulty is experienced in getting a stand, but it fails to get the growth of stalk and seed, which makes the bulk of hay, growing fairly thick, but never getting far from the ground. This is a very unusual complaint, and, indeed, complaints of any kind about orchard-grass are unusual; but with alfalfa failure to make a vigorous growth is much oftener reported. These failures are, without doubt, generally due to causes peculiar to the locality, and without a knowledge of these it is impossible to name their remedy, except in a general way. I am confident, however, that deeper plowing, with liberal application of farm-yard manure, are the sure remedies for nine-tenths of the failures made with grasses and clovers in the agricultural portions of the State. In portions of England and Scotland, now famous for turnip culture, the complaint of failure with roots was nearly universal until, by the use of superphosphates and thorough draining and liberal culture, the land was brought into a condition which enabled it to support the turnip crop. In like manner, many of our Kansas soils demand more liberal treatment from the husbandman before they can be brought up to their full capacity for usefulness.

WHEN TO SOW.

I am unable to add much to the recommendations under this head contained in my report for 1883:

> "The time to sow grass seed is, without exception, in the spring; and recent experience shows that this work should not be undertaken too early in the season. Seed sowed after the spring rains have fairly set in has never failed since 1874 to give a good stand of grass. In a few instances, and where the winter following has been warm and open, we have had good success with timothy and clover sown in fall; but the result of sowing orchard-grass, alfalfa and blue-grass in the fall has been almost certainly disastrous. My experience with grass seeds sown in the fall has been this: they germinate readily, even more quickly than in spring, but as the native vegetation fails from the action of the frosts, the young grasshoppers collect upon the young grass, doing it serious damage; what remains suffers seriously, and is often quite destroyed by the action of the frosts and violent winds of early spring. On the other hand, when the seeding is done too late in the spring, the young and tender plants are consumed by the sun as fast as they appear above the ground. Seed sown any time during the month of April will rarely fail to germinate and make a vigorous growth. However, I cannot advise seeding, as before said, until the warm spring rains set in. I have sown both alfalfa and orchard-grass during the early part of May with excellent results."

I am aware that by many the view is held that inasmuch as the plant casts its seed in the fall season, this is nature's own time for the sowing of seeds, and that in this respect, as in so many others, art can do no better than to copy nature. To this, answer may be made, that nature in her seeding operations is wasteful in the extreme, sowing a thousand seeds that come to nothing for every one that develops a plant. Moreover, this argument for fall-seeding applies equally in the case of corn, oats and similar "spring" grains, which, in a state of nature, are equally with grass seeds sown in the fall. Fall-seeding may be said to be better than seeding in the spring in the case of all plants which make a growth in the fall sufficiently strong to withstand the rigors of winter. This corn and oats and most of our grasses will not do.

DO NOT SEED WITH OTHER CROPS.

In growing corn or wheat, the presence of any other plant, as rye or blue-grass, though intrinsically valuable, is accounted a detriment to the growing crop. The plant is "out of place," and, in the estimation of the farmer, a weed. So oats, or wheat, or rye, among which grass seed has been sown, is a serious detriment to the growing grass, and the grass plants, without doubt, are injurious to the grain. It is often argued that the tall grain will shade and protect the young grass. But grass does not need shade when sown in proper season: it needs the sun; and, especially, it needs moisture, and this the vigorous grain is continually taking from the soil, thus robbing the young grass from the start. Every farmer knows how spindling, sickly, and lacking in strength of root and stem, is a grass or clover plant growing in a dense mass of grain. When this grass is harvested in June or July, just when the summer heats are greatest, the delicate, starved grass plants are certain to perish, unless long-continued cool and cloudy weather prevents.

We are aware that, on favorable seasons, considerable success is obtained by seeding the grass with another crop. But, even during these favorable seasons, a better and more vigorous stand may be obtained without the rivalry of vigorous grains; and, upon dry seasons, a failure of the grass is almost certain, when seeded with a grain crop.

ALFALFA, OR LUCERN (*Medicago sativa*).—For this crop the ground should receive thorough preparation by plowing and harrowing. Sow not less than twenty pounds of seed per acre, and sow this about the middle of April; harrow it lightly, following with a roller if possible. Do not be discouraged if the plants make a feeble growth during the first season, as they usually do. Alfalfa should not be pastured or mowed during this first and critical season. The mower should occasionally be run over the ground high enough to miss the alfalfa and cut off the tops of the weeds. After this season the alfalfa will take care of itself and all the weeds within its reach. Alfalfa is, without doubt, one of the most valuable of the forage plants of Kansas. Wherever irrigation is possible, alfalfa is simply invaluable; but even in the central and eastern portions of the State, it is a profitable and eminently satisfactory forage crop. Very close pasturing late in the season and very severe freezing when the ground is not well protected with snow, have proved almost certainly fatal to alfalfa; and the stand, after the third or fourth year, usually becomes so thin as to make it no longer a profitable crop. Like orchard-grass, alfalfa never self-seeds or thickens or spreads in the least beyond the ground originally seeded. Alfalfa makes good pasture for stock of all kinds, and is quite unequaled among forage crops for "hog pastures." It yields enormously of hay, of an inferior quality, I am bound to add. We have cut four crops of a ton and a half of hay per acre from the same ground the past year. Nevertheless, in a country which gets its moisture directly from the clouds, it will not pay to raise alfalfa for its hay. Alfalfa should have much field room after cutting. If dried hastily, the valuable portions of the plant — the leaves — will break off in handling and be lost, and only woody, inedible stalks remain. It should be cured slowly in the windrow and "cock" — at best a slow operation; and if, meanwhile, a considerable shower falls, the hay is almost certainly ruined beyond recovery.

ORCHARD-GRASS (*Dactylus glomerata*).— Every year's experience adds to my good opinions of orchard-grass. For every section of the State, I say, without any kind of reservation, it is the first kind to try, as the one of all others most likely to succeed. In the eastern section of the State, it competes successfully with blue-grass in the amount and excellence of the pasturage it furnishes, and with timothy in the production of hay; while in the central and western portions, it has been grown with excellent success, after all others have failed. Orchard-grass is one of the earliest grasses to start in the spring, and the last to succumb to frost in the fall. By giving it a good start in the fall, it will furnish good pasture far into the winter. It is consumed with great relish by stock of all kinds, especially if the grass is cropped short. It seems to do equally well upon heavy clay and sandy soils; and any rich and well-drained soil seems suited to it.

It should be remembered that orchard-grass will not make a sod as blue-grass does. It always grows in tussocks, and thick seeding is generally recommended to counteract this tendency to growth in bunches. I am strongly of the opinion that this is mistaken advice, and that much larger yields of pasturage and hay will be furnished by a given area of ground, when the orchard-grass is allowed to have its own way, unchecked by crowding. About 1½ bushels of seed should be sown per acre; and not much more will, under any circumstances, be required. I have obtained excellent results by adding to the above three quarts of red-clover seed. The clover has always thrived with the orchard-grass, besides furnishing to animals that variety of food so agreeable to the taste. In my experience, no amount of tramping or close grazing at any season has been able to injure a well-rooted orchard-grass sod. It will endure late seeding better perhaps than any other sort; but this operation ought not to be delayed much beyond the middle of April.

Orchard-grass upon the College farm, and quite generally in the neighborhood, was almost totally destroyed last winter, presumably by surface ice, *except in case of that seeded the spring before*, which, in the most exposed situations, was uninjured. This is the first accident of the kind that we have had to record in the course of eleven years of experience with orchard-grass.

Red Clover (*Trifolium pratense*) is probably, in the eastern and central counties of the State, as reliable and as useful a crop as in New York or Ohio. Indeed, here in Kansas this useful plant adds another to the long list of its valuable qualities, in that it never "runs out" as in the East, but constantly thickens and sustains itself by self-seeding. In very dry seasons, however, clover lacks the "staying" qualities so remarkable in alfalfa. But while drouth generally reduces the yield — as of all other crops — it will rarely, upon a clay soil, permanently injure the plants. Regarding the relative merits of clover and alfalfa — a question often raised — I have to say that, while clover yields scarcely more than half the hay or pasturage given by alfalfa, in point of quality alfalfa is greatly inferior. The stalks of alfalfa are nearly solid and woody, and the waste in feeding is great as compared with clover.

English Blue-grass (*Festuca elatior.*)—As far west as Manhattan this fescue has shown permanent value. While it suffers from dry weather — as what grass does not? — it retains its hold upon the soil, furnishing in favorable seasons excellent hay and pasturage. It must hold a position in Kansas agriculture greatly below orchard-grass; but that increased experience will discover for it a permanent position, I have no doubt.

Texas Blue-grass (*Poa arachnifera*).—Of this new sort, I said in my report for 1884, that it seemed "to promise much for the winter grazier, being apparently greatly superior for use in this section to its near relative, Kentucky blue-grass." Texas blue-grass makes a very early and vigorous growth, and even during periods of drouth and severe freezing, the peculiar bright purple-green of its foliage is scarcely diminished. This grass is of a much coarser habit than the common blue-grass; it will cut a good swath of hay; and while it does not apparently make as firm and compact a sod as Kentucky blue-grass does, it yet occupies the ground very completely. I have seen enough of this new favorite to warrant me in the statement that it will, without injury, withstand every exigency of our climate, and furnish treble the feed or hay that ordinary blue-grass will furnish. Of the amount of seed required, or, indeed, whether it may be propagated from seed at all, I am unable to speak without further experience.

APPENDIX II.

REPORT OF EXPERIMENTAL PLANTING IN THE HORTICULTURAL DEPARTMENT.

To the Board of Regents — Gentlemen: In this appendix are presented the lists of additions to the experimental plantings made since the publication of the fourth biennial report of the Board of Regents, with notes upon some of those previously planted, and an account of the present condition of the forestry experiments, instituted from ten to fifteen years ago upon the upper College farm.

Respectfully submitted. E. A. Popenoe,
Superintendent of the Grounds, Orchards and Gardens.

Kansas State Agricultural College, June 30, 1886.

LIST OF ADDITIONS MADE IN 1885–86 TO THE EXPERIMENTAL COLLECTIONS OF THE HORTICULTURAL DEPARTMENT.

ORNAMENTAL TREES AND SHRUBS.

CONIFERS.

Abies concolor	Western Balsam Fir.
Cedrus deodara	Deodar Cedar.
libani*	Cedar of Lebanon.
Chamæcyparis Lawsoniana	Oregon Cedar.
Picea alba	White Spruce.
pichta	Siberian Silver Fir.
pungens	Colorado Blue Spruce.
Pseudotsuga Douglasii	Douglas's Fir.
Pinus contorta	California Scrub Pine.
edulis	Piñon.
excelsa	Bhotan Pine.
Jeffreyi	California Bull Pine.
laricio	Corsican Pine.
Massoniana	Masson's Pine.
mitis	Southern Yellow Pine.
ponderosa	Colorado Yellow Pine.
ponderosa, var. Benthamiana*	California Yellow Pine.
Retinospora ericoides	Japan Cypress.
filifera.	
leptocladus.*	
obtusa.	
plumosa.	
squarrosa.*	
Sequoia sempervirens	California Redwood.
Thuya occidentalis, var. aurea*	Douglas's "Golden" Arbor Vitæ.
occidentalis, var. ———	Douglas's "Little Gem."
occidentalis, var. pyramidalis*	Douglas's "Pyramidal."
occidentalis, var. Hoveyi*	Hovey's "Golden."
occidentalis, var.? Sibirica	Siberian Arbor Vitæ.

DECIDUOUS TREES AND SHRUBS.

Acer campestre*	English Maple.
laetum	Red Japan Maple.
macrophyllum*	Oregon Maple.
platanoides, var. Schweidleri	Purple Sycamore Maple.
polymorphum atropurpureum	Cut-leaved Japan Maple.
rubrum	Red Maple.
saccharinum, var. nigrum	Black Sugar Maple.
spicatum*	Mountain Maple.
Pennsylvanicum	Striped Maple.
Actinidia polygama.	
Æsculus hippocastanum	Horse Chestnut.
hippocastanum, var. Lyoni*	Lyon's Chestnut.
hippocastanum, var. rubicunda*	Redflowering Chestnut.
Alnus incana	Black Alder.
glutinosa	Common Alder.
Amorpha canescens	Wild Indigo.
fruticosa	Shrubby Indigo.
Ampelopsis bipinnata	Pepper-vine.
Andromeda arborea	Sorrel-tree.
mariana	Stagger-bush.
racemosa.	
Asimina triloba	Papaw.
Berchemia volubilis	Twining Buckthorn.
Betula lutea.	Yellow Birch.
papyrifera	Paper Birch.
populifolia	American White Birch.
nigra	Red Birch.
alba, var. pendula laciniata	Cut-leaved Weeping Birch.
Bignonia grandiflora.	Large-flowered trumpet-creeper.
Bumelia lanuginosa.*	
Callicarpa purpurea.*	
Calycanthus floridus	Sweet-scented Shrub.
Carpinus caroliniana	Hornbeam.
Caryá alba	Shellbark Hickory.
alba, var. microcarpa	Small-fruited Hickory.
amara	Butternut Hickory.
aquatica.	Swamp Hickory.
porcina	Pignut Hickory.
sulcata	Big Shellbark Hickory.
tomentosa	Mockernut Hickory.
Celtis occidentalis, var. pumila	Shrub Hackberry.
Cerasus hortensis.	
padus	Bird Cherry.
pumila	Sand Cherry.
Sieboldi, var. plena	Double-flower'd Cherry.
vulgaris, var. ranunculiflora	Double-flower'd Cherry
Cercidiphyllum japonicum.	
Cercis japonica	Japan Redbud.
siliquastrum	European Redbud.
Colutea arborescens	Bladder Senna.
Comptonia asplenifolia	Sweet Fern-bush.
Cornus alba	Redtwigged Dogwood.
alternifolia.	Blue Dogwood.
florida, var. pendula	Weeping Dogwood.
mascula	Cornelian Cherry.
Corylus avellana, var. atropurpurea	Purple-leaved Filbert.
Cotoneaster acuminata*	Cotoneaster.
baccillaris	"
buxifolia	"
frigida	"
obtusa	"
speciosa*	"
Wheeleri*	"

Cratægus arborescens	Tree Thorn.
coccinea	Red Haw.
cordata	Washington Thorn.
sanguinea	Red Haw.
——, var. rubra splendens	Red-flowered Thorn.
Cytisus laburnum	Golden Chain.
capitatus	Golden Chain.
Deutzia Fortunei*	Fortune's Deutzia.
gracilis	Slender Deutzia.
crenata, var*	"Pride of Rochester."
Diospyrus viginiana*	Persimmon.
Elæagnus longipes	Oleaster.
parvifolius	"
Euonymus americanus*	Strawberry Bush.
Europæus	European Staff-tree.
radicans	Jap. climb. Euonymus.
Fagus ferruginea	Beech.
sylvatica	European Beech.
sylvatica, var. purpurea	Purple Eur. Beech.
Fraxinus oregona	Oregon Ash.
ornus	Eur. Flowering Ash.
platycarpa	Water Ash.
quadrangulata	Blue Ash.
sambucifolia	Black Ash.
Gleditschia monosperma*	Water Locust.
sinensis	Chinese Honey Locust.
Halesia diptera	Snowdrop.
tetraptera	Silver Bell.
Hydrangea paniculata	Japan Hydrangea.
quercifolia	Oak-leaved Hydrangea.
radicans	Climbing Hydrangea.
Hypericum ascyron*	Siberian St. John's Wort.
Kalmianum	Kalm's St. John's Wort.
patulum*	Japan St. John's Wort.
Indigofera dosua.	
Lespedeza bicolor.	
Ligustrum amurense	Amoor Privet.
buxifolium	Box-leaved Privet.
japonicum	Japan Privet.
myrtifolium	Myrtle Privet.
Stauntoni.	
vulgare	Common Privet.
vulgare, var. variegatum	Variegated Privet.
Lindera benzoin	Spice Bush.
Lonicera sibirica	Siberian Honeysuckle.
Magnolia acuminata	Cucumber Tree.
Soulangeana	Hybrid Chin. Magnolia.
tripetala	Umbrella Magnolia.
Morus japonica	Japan Mulberry.
Nyssa capitata	Gum.
"aquatica"*	Sour Gum.
"multiflora"*	" "
Ostrya virginica	Hop Hornbeam.
Pachystima Canbyi.	
Paliurus aculeatus	Christ Thorn.
Periploca græca	Silk Vine.
Philadelphus columbianus	Oregon Mock Orange.
Gordonianus.	
tomentosus.	
Zeyheri.	
Platanus orientalis	European Plane Tree.

Populus "angulata"	Cottonwood.
Bolleana	Upright Silver Poplar.
"carolina"	Cottonw'd. Carol'a Pop.
"crispa"	Curled-leaved Poplar.
"Empress Eugenie."	
tremuloides	Quaking Aspen.
"Van Geerti."	
Potentilla fruticosa	Shrubby Cinquefoil.
Prunus Pissardi	Purple-leaved Plum.
umbellata	Southern Wild Plum.
Pyrus coronaria	Wild Crab Apple.
malus, var. flexilis	Flowering Apple.
malus, var. floribunda	" "
rivularis	Oregon Crab Apple.
Quercus alba	White Oak.
aquatica	Water Oak.
"Banisteri"*	Scrub Oak.
bicolor	Swamp White Oak.
Catesbæi *	Turkey Oak.
Cerris.*	
cinerea	Upland Willow Oak.
coccinea*	Scarlet Oak.
densiflora	Tanbark Oak.
imbricaria	Shingle Oak.
lobata	White Oak.
lyrata*	Overcup Oak.
macrocarpa	Burr Oak.
nigra*	Black Jack.
obtusiloba	Post Oak.
palustris*	Pin Oak.
phellos*	Willow Oak.
prinoides	Chinquapin Oak.
prinus	Chestnut Oak.
robur*	English Oak.
rubra*	Red Oak.
tinctoria	Black Oak.
Rhamnus carolinianus	Southern Buckthorn.
catharticus	Common Buckthorn.
lanceolatus	Smooth Buckthorn.
Rhodotypus kerrioides.	
Rhus aromatica	Sweet Sumac.
aromatica, var. triloba	Western Sweet Sumac.
copallina	Copal Sumac.
Osbecki	Chinese Sumac.
typhina	Staghorn Sumac.
Robinia viscosa	Clammy Locust.
Rosa arkansana	Arkansas Rose.
arvensis.*	
canina	Dog Rose.
carolina	Carolina Rose.
gymnocarpa.*	
Kamtschatica	Russian Rose.
rugosa*	Ramanas Rose.
Salix annularis	Curled-leaved Willow.
babylonica	Babylonian Weeping Willow.
myricoides	Myrtle Willow.
salamoni.	
Staphylea bumalda*	Japan Bladder-nut.
*colchica	Asiatic Bladder-nut.
Spiræa carpinifolia	White Spiræa.
chamaedrifolia*	White Spiræa.
tomentosa	Hardhack.
vacciniifolia	Spiræa.

Syringa, var. "Ambroise Verschaffelt,"	Lilac.
persica, var. alba	White Persian Lilac.
vulgaris, var. rubra insignis	Purple Lilac.
Tilia europæa	European Linden.
Ulmus campestris, var. monumentalis	European Elm.
racemosa	Cork Elm.
Viburnum lantanoides	Hobble Bush.
oxycoccus	Bush Cranberry.
plicatum	Japan Snowball.
Vitex agnus-castus *	Chaste Tree.
Vitis æstivalis*	Summer Grape.
cinerea.	
cordifolia*	Frost Grape.
heterophylla, var.	
riparia	River Grape.
Weigela amabilis	Weigela.
arborea, var. versicolor.	
candida	White Weigela.
Desboisii	Rose Weigela.
floribunda*	Crimson Weigela.
Grœnwegeni	Rose Weigela.
hortensis, var. nivea*	White Weigela.
Wistaria magnifica	Large-flowered Wistaria.
sinensis	Chinese Wistaria.
Zizyphus lotus*	Jujube tree.

Total number of species and varities added in two years, 242.

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*Sorts of which no specimens remain; of these, some died in the dry, hot weather of the summer of 1885, but by far the greater number were killed during the winter of 1885–6.

FRUITS.

APPLES.

Top grafts set in bearing trees.

Arnold's Sweet.*
Baltzley.*
Britton.
Brooster.
Bunker.
Bunnell.
Burton Keeper.
Byers.*
Camp.
Cotter's Red.
Delavan Early.
DeWolf.
Foote.
Forest.
Hazard.
Hollister Sweet.*
Hoover.*
Isham Crab.*
King's Green.
Klaproth.*
Potter's Stripe.*
Potter's Sweet.*
Risler.*
Scott's Best.*
Shields.
Striped Sweet.
Suter.
Travis.
Trinen.
Vincent Sweet.
Walworth.*
Williams's Early Sweet.

Number of sorts added — 32.

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*Alive at date. The remainder killed by twig blight. The names are those received with scions.

PEACHES.

Amelia.
Bishop's Early.
Bonanza.
Chinese Honey.
Clarissa.*
Crimson Beauty.
Druid Hill.
Early Beauty.
Elberta.
Eldred Cling.
Family Favorite.*
Gaylord.
Gem Cling.
General Lee.
General Taylor.
Grosse Mignonne.
Henrietta.
Infant Wonder.*
Jennie Worthen.
Johnston's Cling.
King of the Earlies.*
King of the World.
Leopard.
Lord Palmerston.
Mrs. Brett.*
Onderdonk's Favorite.
Onward.
Picquet's Late.
Princess of Wales.*
Raisin Cling.
Ringgold.
Sallie Worrall.
Stein's Cling.
Sylphide.
Thurber.
Topaz.
Walker.
Yellow Cobbler.*
Yellow St. John.

Total of sorts — 39.

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*Survived the winter of 1885–6.

PLUMS.

Blackman.
Caddo Chief.
Clinton.*
De Soto.
Early Red.
Etter.*
Fanny.
Forest Garden.*
Golden Beauty.*
Hungarian.*
Indian Chief.
Jennie Lucas.
Lone Star.
Marianna.*
Mussey.
Quaker.
Wayland.*
Weaver.*
Yellow Transparent.

Number of sorts — 19.

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* Survived the winter of 1885–6.

APRICOTS.

Eureka.
Jackson.
Number of sorts—2.

All trees of the apricot in our orchard were killed last winter.

GRAPES.

Cambridge.*
Champion.*
Cornucopia.
El Dorado.
Etta.
Eumelan.
Faith.*
R. B. Hayes.
Herbert.
Hermann.
Highland.
Jefferson.
Lady Washington.
Mason's Seedling.*
Massasoit.
Merrimack.
Montefiore.
Noah.*
Poughkeepsie Red.
Prentiss.
Triumph.
Ulster Prolific.
Venango.
Vergennes.
Wyoming Red.
Worden's Seedling.

Number of sorts—26.

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* Survived the winter of 1885–6.

NOTES UPON SOME LAWN TREES AND SHRUBS.

Of the coniferous trees now growing on the grounds, the best of success has followed the planting of the red cedar, the Austrian pine, the Scotch pine, the Table mountain pine, and the Southern pitch pine. In a second rank may be placed the Norway spruce, the white spruce, the dwarf mountain pine, the white pine, the bald cypress, and probably the gingko or Salisburia. The American arbor vitæ and most of the junipers give more often failure than success. All of the above have been growing, or at least have been repeatedly planted through periods of from five to to fifteen years. Of later planting, many sorts, after passing the several recent trying seasons, give promise of success, but further trial is needed to show the degree of their value.

Caragana arborescens. This neat shrub is entirely hardy, of clean, rather formal growth, of early maturity, producing its abundant yellow pea-shaped flowers at three or four years, and reproducing easily from seed. Its pinnate foliage is of a soft, pleasing, yellowish green in summer, and its new bark a dark green in winter, making it ornamental at both seasons. Its complete endurance of both summer heat and winter cold is not the least of its recommendations.

Catalpa kœmpferi. A small tree of Japanese origin, producing abundantly on the tips of the new growth panicles of brown-spotted, yellowish flowers, of small size for a catalpa, followed by slender, dark-brown pods of 9 to 12 inches in length. Less ornamental than others of this genus, of less pleasing form, but worth planting in places of limited extent, on account of its smaller size, and in larger lawns, for the sake of variety. The species has so far shown perfect hardiness with us after becoming established.

Cercis canadensis. Common Redbud. A small native tree, familiar to all in spring, when its leafless branches are thickly set with purple pea-blossoms. Irregular in growth, it however becomes a shapely tree in the hands of the tree lover, and deserves more general attention than it receives. Set before a group of heavy pines or cedars, it gives a pleasing relief to their too somber green, and grouped with some white-flowered tree, even with our native plums, the effect is most pleasing.

Cornus alba, or "*Sibirica.*" Red-twigged Dogwood. A shrub of Asiatic origin, grown for its deep red twigs, which brighten the lawn in winter. This dogwood has proven moderately hardy upon our grounds, our best specimen having grown in the protection of a clump of other shrubs. It is naturally of a diffuse habit of growth, and grows in the form of a round or spreading bush, with many equal branches, from near the ground, producing an abundance of new wood, upon which the red bark is the brightest. It suffers somewhat under our summer sun.

Cratœgus crus-galli. Cockspur Thorn. Sparingly occurring as a native in Eastern Kansas. A rather straggling little tree, with long rigid spines, smooth glossy leaves, white flowers and red fruit, like miniature apples. This thorn is very beautiful in autumn, from its richly colored leaves. It is perfectly hardy here.

Cratægus oxyacantha. Hawthorn. This thorn, the well-known hedge plant in England, proves fairly successful with us. Some of its varieties are very attractive shrubs, and will fully repay any care needed to establish them. A sheltered situation is desirable for this species.

Cydonia Japonica. Japan Quince. Though but little planted, a most desirable shrub; perfectly hardy, so far as its growth is concerned, and a profuse bloomer. The buds occasionally suffer from late frosts. The flowers range in the different-named varieties through dark and light red to rose-white, those of some sorts being semi-double. May be propagated by root cuttings taken in the fall, and treated like root cuttings of the blackberry. Moderate success may be had in root grafting the newer wood upon apple seedlings.

Euonymus atropurpurens. Wahoo, Staff Tree. A native shrub, capable of much improvement in habit, under care. The bright red fruit, persistent during early winter, constitutes the chief attraction of this plant.

Liriodendron tulipifera. Whitewood, Tulip Poplar. This magnificent tree, native of the States to our eastward, has made fine growth here, whenever given a suitable situation. It grows poorly on thin soils, but in richer soils of fair depth, its growth and health leave nothing to be desired. The least favorable exposure is a southwestern one, hot suns and winds injuring the bark of the young trees in a degree. The tree makes slow growth for some time after transplanting, unless small trees are selected.

Lonicera Tartarica, and varieties. Tartarean or Bush Honeysuckle. Shrubs of neat upright growth, thickly clothed in the growing season with leaves which appear very early in spring and persist until late autumn. Flowers varying in the different sorts from deep crimson pink to pure white, succeeded by berries of different shades of red. This species is easily kept in shape, and is propagated readily by cuttings of ripe wood taken in full.

Lonicera xylosteum. European Bush Honeysuckle, in some sorts is a desirable shrub where variety is demanded, but with us proves much inferior in general effect and usefulness to the Tartarean.

Populus rotundifolia. Round-leafed Poplar from Japan. Worked standard high upon a suitable stock, this tree has so far proven quite hardy, and has grown well. It affords a pleasing variety among the more common poplars.

Populus certinensis and *P. nolestii*, two Siberian sorts, have proven poorly adapted to our site so far as the experience of the last four years will show. While they make a strong growth from cuttings and are in the main healthy during the first year, they thereafter grow feebly, the leaves becoming rust-spotted in summer and the fresh twigs often blackening and dying. Thus diseased, they are often killed back in winter throughout the newer growth.

Phellodendron Amurense. Siberian Cork Tree. A tree in general appearance resembling the sumacs or ailantus, having rather coarse twigs and large pinnate leaves, the latter a rich dark-tinted green when new. In sheltered situations here it is fairly hardy, though it suffers from sun-scald upon the trunk when exposed to the southwest sun and wind.

Rhamnus utilis. Buckthorn. A shrub received from France under this name has made a fine, healthy growth, and has so far proven quite hardy. Its chief recommendation for a place on the lawn, lies in its abundant, polished, dark-green foliage, turning in autumn to rich metallic or bronzed green. Its black fruit is persistent in early winter.

Spiræa opulifolia, var. *aurea.* Golden Spiræa. A healthy and hardy shrub, attaining a large size, its leaves a good yellow during spring and early summer; valuable for massing with dark colored foliage, or handsome when well kept, as a single specimen. It is propagated with some difficulty by cuttings taken in fall and kept in a cold-frame over winter.

Spiræa Van Houtii. The best white spiræa. It is perfectly hardy, of beautiful form, when young, even when unpruned, and is clothed in May with clear white blossoms, giving its slender flexuous branches the appearance of solid wreaths of white. It is scarcely less attractive in autumn, when its leaves assume all shades of rich yellow and red. It is easily propagated by cuttings treated as above, or by rooted shoots from the crown.

Spiræa prunifolia, double white "Bridal Wreath." An excellent old sort, but its buds often destroyed by late frosts. Otherwise quite desirable.

Staphylea trifolia. Bladder-nut. This small native tree is much improved in habit by judicious pruning, and may be made worthy a place in any lawn where variety is desired. The flowers are pretty though not conspicuous, and the twigs and young branches are handsomely striped.

Vitis indivisa. A native white-fruited grape of abundant, clean, shining foliage, perfectly hardy, not disfigured by insects, and desirable where an ornamental climber of its kind can be used. When allowed to grow on the lawn without support, and with no training except moderate pruning, and summer pinching of the stronger branches, it forms a mound of rich, shining green, worth all the room and care it demands.

THE PRESENT STATUS OF THE ARTIFICIAL FORESTS UPON THE UPPER COLLEGE FARM.

The following notes upon the state of growth in the College forest plantations will be best understood if read in connection with the record of the planting as given in early reports to the Board of Regents by Professor E. Gale, then in charge of the Horticultural Department. I have accordingly prefaced my notes with such extracts as are pertinent to the questions of success or failure, thinking that the record so made may furnish information of value to those contemplating tree culture in situations similar to that of our groves. While the measurements and results given are not those of a phenomenal growth, and scarcely as surprising as those we read in the circulars of land agents, they may be taken at least as fairly representing the average growth upon our dry uplands, and as still affording encouragement to those who would utilize such land in a profitable manner.

I quote from the report for 1872:

> The land selected for this purpose [forest-tree culture] was the least adapted to the cultivation of cereals or root crops of any now broken upon the College farm.* This selection, all things considered, was thought best, for it is in general this quality of soil — the high, gravelly, broken ridges — which should ultimately be planted to forests. It is, then, a matter of interest to learn what may be expected as the result of forest culture on such exposed situations as the one selected. As was anticipated, the growth of the young trees has not been so vigorous here as it would have been on lower and richer land, but still abundantly sufficient to give the most encouraging promise of future success. The planting this year consisted of European larch, white ash, red ash, green ash, Osage orange, catalpa bignonioides, ailantus, black walnut, white hickory, soft maple, and willow.
>
> Of the European larch planted, fifty per cent. died, most of them after the 1st of July. The white ash, one-year seedlings, have grown from two to three feet. The white and red ash seed failed to germinate. The green ash have grown from twelve to twenty inches from seed. The Osage orange was planted with special reference to forest culture. The seeds of ailantus were purposely planted upon the highest and dryest ground, some of it gravelly, from the belief that this tree, with its tendency to a late succulent growth, will be hardy upon such a soil, if at all, in Kansas. The growth of this tree so far will justify further experiments. The catalpa has made a growth of twelve to twenty inches. Cuttings of about eighty varieties of willow were planted; about sixty varieties lived. A small number of these present a promising appearance, having grown from four to six feet. A native willow, which is found occasionally along our streams, has also been planted upon our upland for testing its availability for general forest culture. So far it promises well. [The promise not at all fulfilled.]

[*From the Report of 1874.*]

> Among those trees that are making a good growth upon upland may be mentioned the catalpa, silver maple, Osage orange, white ash, green ash, ailantus, black walnut, common cottonwood, and Lombardy poplar. It is worthy of remark that the ailantus has made a good growth upon the driest land that we have, and in such situations has suffered very little from the winter, while upon rich bottom lands it is only half hardy. The European larch, after repeated trials, has not proved a success. The

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*Now the upper farm.

same may be said of the birches, beech, and, with some slight modification, of the sugar maple and American chestnut. . . . This year has been one of peculiar disaster. [Referring to the invasion of locusts.] Evergreens of most varieties have suffered materially, where they have not been killed by defoliation. The only evergreens that have entirely escaped the grasshopper are the red cedar, mountain pine, and pitch pine. The Austrian pine was partially defoliated, while the Scotch pine, the Norway spruce, the Irish juniper and the American arbor vitæ were nearly all ruined.

[*From the Report of 1875.*]

The evergreens in the nursery, which in part or wholly escaped the locusts, are the Austrian pine, pitch pine, table-mountain pine, American spruce, and red cedar. But all very small evergreens, and those of all sizes recently transplanted, perished. That portion of the forest devoted to deciduous trees, came through last season with comparatively little injury. The most marked exception to this were the European larch and the American chestnut. The former of these perished entirely, while the latter can be scarcely counted better than dead. The evergreen trees (in the forest) were mostly killed. The only exception to this is the Austrian pine.

THE PRESENT STATUS OF THE EXPERIMENT

May be shown by the following notes:

The White Ash plantation stands in the best part of the poor land occupied by the entire grove, being in a slight depression heading a small ravine, and facing the south. The trees stood originally in rows about five feet apart. Four years since, in response to an apparent demand for thinning, trees were cut out at such intervals as to allow those remaining to stand at about seven or eight feet apart. The trees cut out, trimmed and seasoned, furnished poles of great value for many purposes, being straight and tough, while some used as fuel proved equal in this regard to the best wood in our markets. Measurements with a tape-line, at four feet from the ground, give, as an average of 25 specimens taken in succession while walking across the plantation, a circumference of 13 and a fraction inches. Seven of the 25 exceeded a diameter of five inches at the height given. The trees stand over 25 feet high, straight, and usually without forks. Ninety per cent. of them will furnish, now, serviceable poles twenty feet in length. The undergrowth is light, and is composed of sprouts from the stumps of the trees cut out, with a number of raspberry, gooseberry and coral-berry vines, doubtless planted by the birds that frequent the groves in great numbers in the breeding season. There is but little herbage, and that mostly a thin grass and woodland weeds.

The Osage Orange plantation stands as made, trees three to four feet apart in rows four feet apart. No systematic thinning has been made. The trees average over twenty feet in height, and as shown by measurement at a height of one foot from the ground, over ten inches in circumference. As will be understood, they are much more generally branched low, and the trunk often divided at the height of one foot from the ground. The lower branches do not so readily kill out by shading as in other trees. There is no undergrowth except where gaps occur in the plantation. At this size the timber has little value save as poles for use in the garden or vineyard, in which service, however, they cannot be equaled if cut while growing, and stripped of their bark before seasoning.

The Soft or White Maple is growing on about as high ground as the plantation site affords, but owing to the mutual protection of the closely-planted trees, this grove on a sterile southern slope, shows an excellent growth. The trees stood originally about 4 feet apart each way, but were thinned four years ago to 8 feet apart. They stand over 30 feet high, with straight, unbranched trunks, and show an average girth of over 15 inches, at four feet from the ground. At least 95 per cent. of the trees would furnish straight poles over 20 feet long. The undergrowth is less abundant than in the ash grove, and is composed of about the same vegetation. A small number of the trees, some of them even in the thickest parts of the grove, show on their southwest sides the effects of sun-scalds, and the work of flat-headed borers.

The Catalpa, upon equally poor ground with the soft or white maple, has also made a very satisfactory growth. The tree is less straight, and more large branches survive, dividing the trunk, and rendering it less valuable as timber at this stage of growth than it would otherwise be, but considering the high quality of the wood for certain purposes, we should rate the catalpa, at this age in our forest-plantation, second only to the white ash. The trees seem to be mostly of the *speciosa*, though catalogued in the report above quoted as "*bignonioides*." They seem to have been planted at irregular distances in the rows and quite closely, so that now trees 3 or 4 inches in diameter stand, half a dozen together, at distances of 18 inches from each other. This grove has received no systematic thinning, though posts and poles have been cut here and there. There is practically no underbrush excepting the sprouts from stumps of trees removed. At the height of four feet the trees have an average circumference of 15 inches, one-third of the number measuring 15 inches or over, the largest 22 inches in circumference. The trees have a height of about 25 feet.

The Ailantus grove, on the highest ground, is now a thicket of all sizes, down to last year's sprouts. The trees have not been thinned out, and were evidently planted at about 4x5 feet, though the rows are filled up by sprouts, some of which are nearly as large as the original seedlings. The trees selected as the oldest in the grove, average eighteen feet high, and have a girth at four feet of eleven inches. On the outskirts of the grove occasional trees have twice this circumference. There is no undergrowth in this grove, except ailantus sprouts.

Black Walnuts standing as planted, about 4x4 feet, have made a clean straight growth, averaging over fifteen feet high, and at four feet from the ground, eight inches in circumference. The plantation never having been thinned, the close stand of the trees has resulted already in the death and decay of all the branches on the lower part of the trunk, promising straight timber when of larger size. A second plantation, apparently about three years younger, shows this process of self-pruning in progress. These trees, standing 4x1½ feet apart, averaging twelve feet in height and one and a half inches in diameter at four feet, carry no live branches below a height of about six feet, though the trunks are set with dead ones nearly ready to fall through the decay of the branch at the base. The undergrowth of the walnut groves consists of scattering wire-grass, golden rod and sumac.

In marked contrast to the self-pruning black walnuts stand the *Box Elders* alongside. Planted at the same distances and at the same time with the walnuts, these trees are sixteen feet high, and at a height of four feet, two inches in diameter. Yet the numerous branches and sprouts from the bases of the trees are mostly as fresh as those above. Trees of the *Green Ash* of some age, and planted equally close, adjoining the box elders, are two or three feet higher and have a diameter of two inches at a height of four feet. On these the branches on the lower part of the limbs are all dead and ready to drop. As in the white ash and walnut groves, the trees are remarkably straight and clean in growth. There is practically no undergrowth in this grove.

If I were asked after a walk through these groves to select from the list the three that seemed on the present evidence to be the best worth a further and extended planting on such soil, with a view to earliest profit, I should name the white ash, the catalpa, and the soft maple. The evidence of neighboring plantations shows the equal importance of the black walnut on lower and richer soil, and this tree may even on the sterile hills become some day of useful size. I cannot speak very favorably of the ailantus so far as I may judge from the present plantation, except to remark its very evident ability to maintain a succession of growths after the ground is once planted. It would seem that the Osage orange and catalpa would be much better matched, and low forking prevented, by pruning, than allowed to grow unpruned with the ashes and the walnut.

Finally, the result so far given in the groves we have been considering affirm the soundness of the argument advanced by Professor Gale, when in beginning these plantations he insisted upon close planting as the surest means of procuring at little expense of care and cultivation a useful growth of timber.

APPENDIX III.

LAWS OF THE UNITED STATES AND KANSAS, RELATING TO THE STATE AGRICULTURAL COLLEGE, UP TO THE YEAR 1886.

WITH SUMMARY OF REGULATIONS.

[*Chapter CXXX, United States Laws, 1862.*]

AN ACT donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State a quantity equal to thirty thousand acres for each Senator and Representative in Congress to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: *Provided*, That no mineral lands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted*, That the land aforesaid, after being surveyed, shall be apportioned to the several States in sections or subdivisions of sections not less than one quarter of a section; and whenever there are public lands in a State subject to sale at private entry at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands within the limits of such State; and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry at one dollar and twenty-five cents per acre, to which said State may be entitled under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share: said scrip to be sold by said States, and the proceeds thereof applied to the uses and purposes prescribed in this act, and for no other use or purpose whatsoever: *Provided*, That in no case shall any State to which land scrip may thus be issued be allowed to locate the same within the limits of any other State or of any Territory of the United States, but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry at one dollar and twenty-five cents or less per acre: *And provided further*, That not more than one million acres shall be located by such assignee in any one of the States: *And provided further*, That no such location shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted*, That all the expenses of management, superintendence and taxes from date of selection of said lands previous to their sales, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong, out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purpose hereinafter mentioned.

SEC. 4. *And be it further enacted*, That all moneys derived from the sale of the lands aforesaid by the States to which the lands are apportioned and from the sales of land scrip hereinbefore provided, shall be invested in stocks, of the United States or of the State or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the money so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section six of this act), and the interest of which shall be inviolably appropriated by each State, which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 5. *And be it further enacted*, That the grant of land and land scrip hereby authorized shall be made on the following conditions, to which, as well as to the provisions hereinbefore contained, the previous assent of the several States shall be signified by legislative acts:

First, If any portion of the fund invested, as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished; and the annual interest shall be regularly applied without diminution to the purposes mentioned in the fourth section of this act, except that a sum not exceeding ten per centum upon the amount received by any State under the provisions of this act, may be expended for the purchase of lands for sites or experimental farms, whenever authorized by the respective Legislatures of said States.

Second, No portion of said fund, nor the interest thereon, shall be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings.

Third, Any State which may take and claim the benefit of the provisions of this act shall provide, within five years at least, not less than one college, as described in the fourth section of this act, or the grant to such State shall cease; and said State shall be bound to pay the United States the amount received on any lands previously sold, and that the title to purchasers under the State shall be valid.

Fourth, An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State industrial and economical statistics, as may be supposed useful; one copy of which shall be transmitted by mail free, by each, to all the other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

Fifth, When lands shall be selected from those which have been raised to double their minimum price, in consequence of railroad grants, they shall be computed to the States at the maximum price, and the number of acres proportionally diminished.

Sixth, No State while in a condition of rebellion or insurrection against the Government of the United States shall be entitled to the benefits of this act.

Seventh, No State shall be entitled to the benefits of this act unless it shall express its acceptance thereof, by its Legislature within two years from the date of its approval by the President.

SEC. 6. *And be it further enacted*, That land scrip issued under the provisions of this act shall not be subject to location until after the first day of January, one thousand eight hundred and sixty-three.

SEC. 7. *And be it further enacted*, That the land officers shall receive the same fee for locating land scrip issued under the provisions of this act as is now allowed for the location of military bounty land warrants under the existing laws: *Provided*, Their maximum compensation shall not be thereby increased.

SEC. 8. *And be it further enacted*, That the governors of the several States to which scrip shall be issued under this act shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds.

Approved July 2, 1862.

JOINT RESOLUTION accepting the provisions of an act of Congress, entitled "An act donating public lands to the several States and Territories, which may provide colleges for the benefit of agriculture and the mechanic arts," approved July 2, 1862.

Be it resolved by the Legislature of the State of Kansas:

That the provisions of the act of Congress, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," approved July 2, 1862, are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act.

Resolved, That, upon the approval of this act by the Governor, he is hereby instructed to transmit a certified copy of the same to the Secretary of State and Secretary of the Interior of the United States.

Approved February 3, 1863.

[*Took effect February 19, 1863.*]

AN ACT to locate and establish a college for the benefit of agriculture and the mechanic arts.

Whereas, The Congress of the United States, by an act approved July 2, 1862, and entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," granted to the State of Kansas, upon certain conditions, ninety thousand acres of public lands for the endowment, support and maintenance of a college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life; and

Whereas, The State of Kansas by its Legislature has expressed its acceptance of the benefits of the said act of Congress, and has agreed to fulfill the conditions therein contained; therefore,

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That the college, in the foregoing preamble mentioned, be and the same is hereby permanently located at and upon a certain tract of land, situated and being in the county of Riley and the State aforesaid, and bounded and described as follows: Commencing at a point forty rods east of the northeast corner of the southwest quarter of section number twelve, in township number ten south, and range number seven, east of the sixth principal meridian; thence running south parallel to the east line of said quarter-section, eighty rods; thence west two hundred rods, more or less, to the west line of said quarter-section; thence north on the west line of said quarter-section eighty rods, to the north line of said quarter-section; thence east two hundred rods, on the north line of said quarter-section, to the point of beginning, containing one hundred acres: *Provided, however*, That the location of said college, as aforesaid, is upon this express condition: that the Bluemont Central College Association, in whom the title of said land is now vested, shall within six months from and after the approval of the Governor hereto, cede to the State of Kansas, in fee simple, the real estate above described, together with all buildings and appurtenances thereunto belonging; and shall, within such time, transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association.

SEC. 2. The Governor of the State is hereby authorized to receive the title papers by which the foregoing mentioned property may be transferred to the State, and to cause the same to be duly recorded in the proper office, and to be deposited in the office of the auditor of State.

SEC. 3. This act shall be published twice in some newspaper printed at Topeka, and shall take effect and be in force from and after such publication.

Approved February 16, 1863.

DEED OF GIFT UNDER THE ABOVE ACT.

This indenture, made and entered into the 10th day of June, A. D. 1863, between the President, Secretary and Board of Trustees of the Bluemont Central College Association, a corporation duly existing by virtue of the laws of the State of Kansas, and having its place of business at Manhattan, in Riley county, State of Kansas, thereto duly authorized parties of the first part, and the State of Kansas, party of the second part, witnesseth, that said party of the first part, for and in consideration of the permanent location and establishment of a college for the benefit of agriculture and the mechanic arts on the premises hereinafter described, by the State of Kansas, by an act of its Legislature entitled "An act to locate and establish a college for the benefit of agriculture and the mechanic arts," approved February 16, A. D. 1863, do grant and convey unto said party of the second part a certain tract of land situate and being in the county of Riley aforesaid, and bounded and described as follows, to wit: Commencing at a point forty rods east of the northeast corner of the southwest quarter of section number twelve, in township number ten south, and range number seven, east of the sixth principal meridian; thence running south parallel to the east line of said quarter-section eighty rods; thence west two hundred rods more or less, to the west line of said quarter-section; thence north on the west line of said quarter-section eighty rods, to the north line of said quarter-section; thence east two hundred rods on the north line of said quarter-section, to the point of beginning, containing one hundred acres; together with all the buildings and appurtenances thereunto appertaining, and also all the apparatus and library belonging to said Bluemont Central College Association on the 16th day of February, A. D. 1863: to have and to hold all of said land, buildings, apparatus, library, etc., to the said State of Kansas forever, on condition that the said land, buildings, appurtenances, apparatus, library, etc., shall be forever used by said State of Kansas, or under its authority, for the purposes contemplated by said act of February 16, A. D. 1863. And said parties of the first part guarantee that the title to said property is vested, the execution of this deed perfect in them, and that they have good right to convey as herein intended.

In witness whereof, said parties of the first have hereunto caused the corporate seal and the names of Isaac T. Goodnow, as President, and W. Marlatt, as Secretary, and their said Trustees, to be affixed on the day and year above written.

ISAAC T. GOODNOW, *President.*
WASHINGTON MARLATT, *Secretary.*
ABRAHAM BARRY,
JAMES HUMPHREY,
JOSEPH DENISON,
JOHN PIPHER,
WILLIAM A. MCCOLLOM,
JAMES M. LACKEY,
SAMUEL D. HOUSTON,
ROBT. L. HARFORD,
Board of Trustees.

STATE OF KANSAS,
ATCHISON COUNTY, } *ss.*

Be it remembered, that on this 11th day of June, A. D. 1863, before the undersigned, a notary public in and for said county, appeared personally Isaac T. Goodnow and Washington Marlatt, to me personally known to be the identical persons whose names are affixed to the foregoing deed as grantors, and acknowledged the same to be their own voluntary act and deed for the uses and purposes therein mentioned.

ISAAC T. GOODNOW. [L. S.]
WASHINGTON MARLATT. [L. S.]

In witness whereof, I hereunto set my hand and seal.

JACOB SAGIN, *Notary Public.* [L. S.]

STATE OF KANSAS, } ss.
RILEY COUNTY, }

On this 2d day of July, A. D. 1863, before me, the subscriber, County Clerk in and for the county aforesaid, personally appeared Abraham Barry, James Humphrey, Joseph Denison, John Pipher, Wm. A. McCollom, J. M. Lackey, S. D. Houston, R. L. Harford, well known to me to be the identical persons who executed the foregoing instrument, and they severally acknowledged that they executed the same as their own free and voluntary act and deed, for the uses and purposes therein mentioned.

Witness my hand and official seal, on the day and year last above written.

A. HUNTRESS, *County Clerk.* [L. S.]

A true copy. Attest:

A. HUNTRESS, *Register of Deeds.*

Received for record, July 6, A. D. 1863, at 3 o'clock P. M.

[*Took effect March 3, 1863.*]

AN ACT to provide for the location of lands granted to the State by act of Congress, approved July 2, 1862, and making an appropriation therefor.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. The Governor is hereby authorized to appoint three commissioners to select and locate the lands to which the State is entitled under the act of Congress approved July 2, 1862, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts;" and such commissioners are hereby authorized and empowered to take any and all steps necessary to the complete location of said lands.

SEC. 2. Each commissioner shall receive the sum of three dollars per day for every day's actual service, and his reasonable expenses; and the Auditor is hereby directed to issue warrants on the treasury for the same upon an account, properly verified under oath, being filed in his office. The commissioners shall make a report to the Governor of all their proceedings under this act, to be transmitted by his Excellency to the next Legislature.

SEC. 3. This act shall take effect from and after its passage.

Approved March 3, 1863.

[*Took effect March 11, 1863.*]

AN ACT for the government of the Kansas State Agricultural College for the benefit of agriculture and the mechanic arts.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. The college for the benefit of agriculture and the mechanic arts, which was located by an act of the Legislature of the State of Kansas, entitled "An act to locate and establish a college for the benefit of agriculture and the mechanic arts," approved February 16, 1863, shall be known as the Kansas State Agricultural College.

SEC. 2. The government of such college is vested in a Board of Regents, to consist of the Governor, Secretary of State, Superintendent of Public Instruction, and the President of the College *ex officio*, and nine others, who shall be appointed by the Governor and confirmed by the Senate: *Provided*, That not more than three of those selected shall be members of the same religious denomination. Three of those appointed shall hold their office until the second Monday in January, A. D. 1865, and three until 1867, and three until 1869, and their several successors shall hold their office for the term of six years.

SEC. 3. The Board of Regents shall constitute the body corporate, with the right as such to sue and be sued, to use a common seal, and alter the same at pleasure.

SEC. 4. The Regents shall have power to enact ordinances by laws and regulations for the government of said College, to elect a president, to fix, increase and diminish the regular number of professors and teachers, and to appoint the same and determine the amount of their salaries. They shall have power to remove the president and any professor or teacher whenever the interest of the College shall require.

SEC. 5. The College shall consist of four departments: 1st, The Department of Agriculture; 2d, Mechanic Arts, 3d, Military Science and Tactics; 4th, Literature and Science.

SEC. 6. The immediate government of the several departments shall be intrusted to the president and the respective professors and teachers, but the Regents shall have power to regulate the course of instruction, and to prescribe, under the advice of the Faculty, the books and authorities to be used in the several departments; also, to confer such degrees and grant such diplomas as are conferred by institutions of the highest grade.

SEC. 7. The College shall be open to all persons, under such regulations as may be prescribed by the Regents: *Provided*, That no student shall be refused admittance to this college simply because he has been expelled from some other college.

SEC. 8. The Board of Regents shall make an exhibit of the affairs of the College, in each year, to the Superintendent of Public Instruction, setting forth the condition of the College, the amount of receipts and expenditures, the number of professors and teachers, and other officers, and the compensation of each; the number of students in the several departments, and in the different classes, the books of instruction used, an estimate of the expenses of the ensuing year, a full transcript of the journal of the proceedings for the year, together with such other information and suggestions as they may deem important, or the Superintendent of Public Instruction may require to embrace in his report, which shall be reported by the Superintendent of Public Instruction to the Legislature, in his annual report.

SEC. 9. The Board of Regents shall report annually the progress of said college, recording any improvements and experiments made, with their cost and results, and such other matters, including State and industrial and economical statistics, as may be supposed useful; one copy of which shall be transmitted by mail, free, to all other colleges which may be endowed under the provision of the act of Congress, entitled "An act donating public lands to the several States which may provide colleges for the benefit of agriculture and the mechanic arts," approved July 2, 1862, and also one copy to the Secretary of the Interior.

SEC. 10. A board of visitors, to consist of three persons, shall be appointed by the Governor, to hold their offices severally for one, two and three years, but their successors shall hold their office for three years. It shall be their duty to make a personal examination into the state and condition of the College, in all its departments and branches, once at least in each year, and report the result to the Superintendent of Public Instruction, suggesting such improvements as they may deem important, which report shall be embodied in the report of the superintendent.

SEC. 11. The Regents shall have power to appoint a secretary, librarian, treasurer, and such other officers as the interests of the College may require, who shall hold their office at the pleasure of the Board, and shall receive such compensation as the Board may prescribe.

SEC. 12. The Board of Regents shall have the general supervision of the College, and the direction and control of all expenditures.

Sec. 13. It shall be the duty of the Board of Regents, at their earliest convenience, to secure a collection of specimens in mineralogy, geology, zoölogy, botany, and other specimens pertaining to natural history; and whenever a geological survey of the State may be made, a complete set of specimens collected shall be deposited in the cabinet of the College. The said Board shall make provisions for increasing and preserving the library and apparatus belonging to the said College, and the apparatus and library that may be transferred to the State by the Bluemont Central College Association.

Sec. 14. The first meeting of the Board of Regents shall be called by the Superintendent of Public Instruction, as soon as may be after the fulfillment, by the Bluemont Central College Association, of an act entitled "An act to locate and establish a college for the benefit of agriculture and the mechanic arts," approved February 16, 1863; but all succeeding meetings shall be called in such manner as the said Board may prescribe, and shall be held at the College building, and at least once annually.

Sec. 15. A majority of the Board of Regents shall constitute a quorum to do business.

Sec. 16. The ninety thousand acres of land granted to the State of Kansas by Congress to endow a college for the benefit of agriculture and the mechanic arts, shall be used solely for the endowment of said Kansas State Agricultural College of the State of Kansas, and for no other purpose whatever, and the interest on the fund arising from the sale of said lands shall be used exclusively for the salaries of the president, professors and teachers of this College, but the principal or the money arising from the sale of said lands shall be invested according to law, and be a fund to remain forever undiminished.

Sec. 17. This act shall take effect and be in force from and after its publication once in some paper published at the capital.

Approved March 3, 1863.

Section 16 amended by act approved March 2, 1871.
Sections 2, 4, 8, 9, 10, 11, 12 and 14 amended by act approved March 2, 1873.
Section 10, as amended in 1873, repealed by act approved February 25, 1875.

[*Took effect February 26, 1864.*]

An Act to establish a bureau of immigration, and appoint agents therefor.

Section 3. It shall be the duty of the Faculty of the State Agricultural College, of the State Normal School, and of the State University, when organized, to carefully preserve a daily meteorological record, which, with all such other information relative to climate, soil, minerals, and all other scientific facts bearing upon the resources of the State that such faculties may be able to gather, shall be forwarded for publication to the office of the Bureau, at the capital.

Approved February 26, 1864.

[The existence of this Bureau depended upon appropriations.]

[*Took effect January, 1866.*]

An Act for the sale of lands belonging to the State Agricultural College.

Be it enacted by the Legislature of the State of Kansas:

Section 1. The Board of Regents of the State Agricultural College are hereby authorized and directed to sell, as soon as practicable, and in a manner hereinafter provided, the public lands granted by act of Congress approved July 2, A. D. 1862, to the State of Kansas, for the benefit of agriculture and the mechanic arts.

SEC. 2. The said Board of Regents shall sell any portion of lands mentioned in the preceding section, at a price not less than three dollars per acre, for cash at the time of sale, or upon the following conditions of credit, when deemed by them most conducive to the interest of the College, to wit: In eight equal annual installments, with ten per centum interest on each installment, payable annually. The first installment is to be paid at the date of purchase. The said Board of Regents are hereby authorized and directed to employ an agent or agents to sell said lands, and his rate of compensation, with other expenses of sale, shall not exceed three per centum upon the amount received from the sale of said lands; and he shall also have power to execute to the purchaser, in the name of the State of Kansas, all receipts for purchase-money, and title bonds necessary to be given in the sale of said lands: *Provided*, That on all timbered lands half of the purchase-money shall be paid in advance; and also that a purchaser may at any time pay all arrearages and receive his patent: *Provided, however*, That all expenses of management and superintendence of said lands, and all the expenses attending the sale thereof and the investment of the proceeds which may be received therefrom, shall be paid by the State; and the Auditor of State is hereby authorized to audit all expenses provided for in this act.

SEC. 3. The said agent or agents shall, before he or they enter upon the duties of the office, execute to the State of Kansas a bond in the sum of forty thousand dollars; said bond to be approved by the Governor and filed in the office of the Secretary of State.

SEC. 4. The president and secretary of the Board of Regents, or their agents, shall give receipts to the purchaser of said lands, for the payment of all installments and interest due thereon; and when the last installment upon any one purchase has been paid, the purchaser, his heirs or assigns, shall be entitled to a patent for the land so purchased, from the Governor, under the great seal of the State, which patent shall confer upon the grantee a title in fee simple of the land described in said patent.

SEC. 5. The amount derived from the sale of said land shall, at the end of every three months, be by said agent paid into the State treasury, to be invested in State or United States bonds, by the State Treasurer; and the interest accruing on said deferred payments on said lands sold, together with the interest derived from any investment, shall be applied to the payment of the current expenses of the State Agricultural College and to discharge the debts hereinafter mentioned.

SEC. 6. The Governor, Treasurer and Secretary of the State of Kansas are hereby authorized and directed to issue, on or before the 1st day of April, A. D. 1866, the bonds of the State of Kansas for the sum of five thousand five hundred dollars, the same to be negotiated by the Governor, and the proceeds to be paid into the State treasury; said bonds, with coupons attached, shall run five years from their date, bearing interest at the rate of ten per centum per annum, payable semi-annually at the office of the Treasurer of State, and shall not be sold below their par value.

SEC. 7. The proceeds of the sale of said bonds shall be applied as follows, to wit: The sum of five thousand five hundred dollars to pay arrearages incurred in conducting the Kansas State Agricultural College, and to defray the current expenses of said College for the year 1866; and the Auditor of State is hereby authorized to draw his warrant on the State Treasurer in favor of the treasurer of the Board of Regents, upon an order of said Board.

SEC. 8. The amount to be applied out of the income referred to in section five of this act, to meet the current expenses of said College, shall not exceed four thousand dollars per annum as long as the principal and interest on said bonds herein provided to be issued remains unpaid; and all moneys realized from the accruing interest on said deferred payments and securities, over four thousand dollars per annum, shall be by the State Treasurer applied in liquidation of said bonds, on the first day of January of each year, until the whole of said loan, secured by the bonds herein provided, shall have been paid: *Provided, however*, That if a sufficient fund is raised from the sale of said lands as will afford a surplus income after paying the bonds herein provided to be issued, and interest thereon as the same becomes due, a larger sum to defray the current expenses of said College may be appropriated, if the Board of Regents in their judgment may deem it necessary.

Sec. 9. The agent or agents appointed to sell such lands shall make returns quarterly to the Treasurer of State, and deliver to him a detailed statement, verified by his or their oath, of the number of acres, and a description of the lands sold, by whom purchased, the price per acre, and the terms of sale; and the treasurer of the Board of Regents shall, on or before the tenth day of January of each year, make out and deliver to the Treasurer of State a detailed statement, verified by his oath, of all the expenses of said College for the preceding year; and the Treasurer of State shall, on or before the twentieth day of January of each year, make out and deliver to both branches of the Legislature of the State a detailed statement, showing the amount of land sold, the terms of sale, the amount of money received therefor, and how expended or applied.

Sec. 10. The treasurer of the Board of Regents shall audit all accounts of said agent or agents for the sale of said lands, and all other accounts against said College, and the Auditor of State shall audit all the accounts of said treasurer of said Board of Regents relating to said lands and the sale thereof, and to the current expenses of said College.

Sec. 11. This act shall take effect and be in force from and after its publication once in the *Kansas Educational Journal.*

Approved February 22, 1886.

See act approved March 1, 1870.
Section 5 amended by act approved March 2, 1871, and repealed by act approved March 6, 1877.
Section 9 amended by acts approved February 21, 1867, and March 2, 1877.
Sections 2, 4, 9 and 10 amended by act approved March 6, 1883.

[*Took effect May 27, 1867.*]

An Act providing for the payment of the services and mileage of the Regents in the State institutions.

Be it enacted by the Legislature of the State of Kansas:

Section 1. That all Regents of the State Agricultural College, State University, Directors of the Normal School, and Insane and Deaf and Dumb Asylums, shall receive for their time expended in attending upon the regular meeting of their respective boards, the sum of three dollars a day: *Provided*, That these meetings shall not exceed two days.

Sec. 2. That such Regents and Directors shall receive ten cents per mile for each and every mile actually traveled in going to and returning from such meeting, and the distance shall be computed by the most direct and shortest traveled route.

Sec. 3. That no State officer who is *ex officio* a member of the Board of Regents, nor any Regent or Director living within ten miles of the institution of which he is a Regent, shall receive any per diem or any mileage for attending upon its meetings.

Sec. 4. That all such accounts shall be paid by the Auditor, upon itemized account, duly sworn to by such Regents; that each year the Auditor shall return an estimate of such expenses, to be provided for in the general appropriation bill.

Sec. 5. This act shall take effect and be in force from and after its publication.

Approved February 22, 1867.

Repealed by act approved March 13, 1873.

[*Took effect May 27, 1867.*]

AN ACT to provided for the registry of State lands.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. It shall be the duty of the Auditor of State to procure a suitable and well-bound book, in which he shall cause to be entered all sales of the following classes of lands; viz.: Common school lands, Agricultural College lands, University lands, Normal School lands, Capitol building lands and internal improvement lands, and such other lands as may hereafter be confirmed to the State for any purpose whatever; entering therein the date of sale, description of land, name of purchaser, amount sold for, amount paid at sale, amount of subsequent payments, principal and interest separately, total amount, to whom patented, and date of patent.

SEC. 3. That it shall be the duty of the Board of Regents, or the agents appointed to sell the University lands, the Agricultural College lands and the Normal School lands, to make returns to the State Auditor, on the first of each month, of the sales effected for the preceding month, such return or abstract to embrace such information as will enable the Auditor to make the registry as required in section one of this act.

SEC. 4. That upon presentation of a certificate from the Auditor of State to the Governor that full payment has been made, as appears from the records and accounts in his office, for any piece or parcel of land, the Governor shall thereupon issue a patent to the purchaser, his heirs or assigns, for the piece or parcel of land named in said certificate.

SEC. 5. That immediately after the issuing of the patent, and before the same shall be delivered to the owner, the Auditor of State shall record the same in a book to be by him kept for that purpose, and certify to said record upon the original patent.

SEC. 6. That in case of loss or destruction of patent, from any cause, the party so losing may apply to the Auditor for a certified copy thereof, which, when issued under his hand and official seal, shall be deemed and held to be of the same tenure and effect as the original patent. For such certified copy the Auditor shall be entitled to, and receive from the party applying for the same, a fee of one dollar.

SEC. 7. That all acts and parts of acts inconsistent with this act be and the same are hereby repealed.

SEC. 8. This act shall take effect and be in force from and after its publication.

Approved February 21, 1867.

[*Took effect March 24, 1870.*]

AN ACT to aid the development of the agricultural department of the Kansas State Agricultural College.

WHEREAS, Under an act of Congress approved July 2, 1862, the State of Kansas accepted a grant of ninety thousand acres of land for the endowment of its Agricultural College; and

WHEREAS, The State of Kansas has hithertofore advanced as a loan, from time to time, the several sums necessary to pay the salaries of professors in said College, thus complying with the conditions required that the institution should go into active operation within a limited time, and securing its benefits to the earlier pioneer settlers in this commonwealth: therefore,

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That the several sums advanced to pay the professors in the Kansas State Agricultural College, from the year 1863 to the year 1869 inclusive, be and the same are hereby donated to said College, together with all interest that may have accrued on said sums: *Provided*, That the amount hereby donated shall be used as the Board of Regents of said College may direct, to purchase additional lands for the College farm, to erect buildings, and to develop the agricultural department of said College: *And provided*, That the sum of fifteen hundred dollars may be appropriated from said donation for the purchase of a proper set of arms and accoutrements for the use of the drill class in the military department required by law in said College.

Sec. 2. The treasurer of the Board of Regents is hereby authorized to pay upon the orders of said Regents an amount equal to the sum donated by this act to said College, out of any interest upon the endowment fund that may at any time be in his hands in excess of orders then due for professors' salaries: *Provided*, That if any order drawn on said treasurer on account of the donation made by this act shall not be paid on presentation, said treasurer shall indorse thereon "Not paid for want of funds," and any order thus indorsed shall bear interest at the rate of seven per cent. per annum until paid: *Provided*, There shall be no distinction made by the officers of said institution of applicants for admission on account of color or race.

Sec. 3. This act shall take effect and be in force from and after its publication once in the *Kansas Weekly Commonwealth*.

Approved March 1, 1870.

See act approved March 6, 1877.

[*Took effect March, 1870.*]

An Act entitled "An act to secure the early publication of the reports of officers of State institutions and State officers."

Be it enacted by the Legislature of the State of Kansas:

Section 1. That the Governor of State shall, upon the receipt of the annual reports of the State officers and officers of the State Penitentiary, State Agricultural College, State University, State Normal School, State Asylum for the Insane, State Asylum for the Blind, and State Asylum for the Deaf Mutes, furnish a copy of the same to the State Printer.

Sec. 2. The State Printer, immediately upon the receipt of the several reports named in the previous section, shall publish in pamphlet form two hundred copies of each of said reports for the use of the State officers and members of the Legislature, and three hundred copies of said reports of the officers of the educational and charitable institutions respectively, for the use of the officers of said institutions.

Sec. 3. It shall be the duty of the State Printer to have said reports printed on or before the seventh day of each regular session of the Legislature.

Sec. 4. This act shall take effect and be in force from and after its publication in the statutes.

Approved March 1, 1870.

Amended by act approved February 15, 1877.

[*Took effect March, 1871.*]

An Act amendatory of and supplemental to chapter three of the General Statutes, relating to the Agricultural College.

Be it enacted by the Legislature of the State of Kansas:

Section 1. That section sixteen, chapter three, General Statutes, being an act for the government of the Kansas State Agricultural College, for the benefit of agriculture and the mechanic arts, be amended to read as follows: Sec. 16. The ninety thousand acres of land granted to the State of Kansas by Congress, to endow a college for the benefit of agriculture and the mechanic arts, shall be used solely for the endowment of said Kansas State Agricultural College, and for no other purpose whatever, and the interest on the fund arising from the sale of said lands shall be used as the Board of Regents may determine, for the maintenance, support and development of the said Agricultural College; but the principal or the moneys arising from the sale of said lands shall be invested according to law, and shall constitute a fund to remain forever undiminished.

Sec. 2. That section five, chapter three, General Statutes, being an act for the sale of lands belonging to the State Agricultural College, be amended to read as follows: Sec. 5. The amount derived from the sale of said lands shall at the end of each month be by said agent paid into the treasury of the said Agricultural College, to be invested as the Board of Regents may direct, in school-district or State bonds, or by note and mortgage on unincumbered real estate worth double the amount loaned thereon.

Sec. 3. The Board of Regents shall appoint a Loan Commissioner, whose duties shall be to make all loans or investments of the funds belonging to the said Agricultural College, as directed in the preceding section. The Board of Regents shall adopt rules and regulations prescribing the manner in which all loans and investments shall be made by said Loan Commissioner. They shall require him to keep an accurate account, in a book kept for that purpose, of all loans or investments. He shall draw his warrant upon the treasurer for such sums as he may loan or invest, specifying in the warrant to whom the same is loaned, or in what manner invested. He shall draw no warrants except for loans or investments, and separate warrants shall be drawn for each and every loan and investment. He shall transmit or deliver to the treasurer all notes, mortgages, bonds or other evidence of indebtedness by him received for loans or investments. He shall make no loans or investments until the application has been approved by the executive committee of the Board of Regents. All loans or investments shall be made in the name of the Kansas State Agricultural College. All loans shall be made at twelve per cent. interest, payable annually in advance; and the expense of all papers, abstracts of titles, and record of mortgages, shall be paid by the mortgagor. All mortgages shall be conditioned that in case of foreclosure, all attorney's fees, expenses and damages incurred thereby, shall be paid by the mortgagor.

Sec. 4. The State Treasurer is authorized and directed to deliver to the treasurer of said Agricultural College, upon the order of its Board of Regents, all moneys, bonds, or other evidences of indebtedness, belonging to said Agricultural College.

Sec. 5. The treasurer of the said Agricultural College shall, before he receives from the Board of Regents the order for the funds in the hands of the State Treasurer, execute and give a bond, with five or more securities, to be approved by the Board of Regents, in double the amount of the funds of the said Agricultural College, as near as the same can be ascertained, which will come into his hands as treasurer during his term of office, payable to the Kansas State Agricultural College, and conditioned for the faithful discharge of his duties as treasurer of said College. He shall keep an accurate account in a book to be kept for that purpose, of all moneys, notes, bonds or other evidence of indebtedness coming into his hands as treasurer, and shall keep a separate account of the endowment and interest funds: he shall pay out no moneys except upon the order of the Board of Regents or Loan Commissioner.

Sec. 6. The Board of Regents may, if they deem it for the interest of the said Agricultural College, direct the treasurer to sell or dispose of any or all bonds or other evidences of indebtedness belonging to the said College, on such terms as they may prescribe, and the Loan Commissioner shall, under their direction, reinvest the proceeds as provided in section two of this act.

SEC. 7. Any person failing to pay the purchase-money for any of the lands purchased from the Kansas State Agricultural College, or any installment of the same, shall forfeit all right to the land from the time of such failure of payment, and the Board of Regents shall proceed to eject such person from said land if in possession.

SEC. 8. This act shall take effect and be in force from and after its publication in the *Kansas Daily Commonwealth.*

Approved March 2, 1871.

Section 1, contravened by acts approved March 3, 1876, and March 5, 1877.
Section 2, repealed by act approved March 6, 1877.
Sections 3, 4, 5 and 6, amended by act approved March 6, 1883.

[*Took effect March 13, 1873.*

AN ACT entitled "An act to provide for the appointment of regents and trustees for the control of the public institutions of the State, and defining certain powers thereof."

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. The State institutions of learning shall each and all be governed by a board of regents, composed of seven persons, of whom one shall be *ex officio* and the remaining six shall be appointed by the Governor, with the advice and consent of the Senate. The one holding office *ex officio* shall be the Chancellor or President.

SEC. 2. The Governor shall appoint for each of said institutions of learning, in the year 1873, six regents, of whom two shall hold their position for a term of one year, ending April 1, 1874; of whom two shall hold their position for two years, ending April 1, 1875; and the remaining two for three years, ending April 1, 1876; and their successors shall each hold office for the term of three years, expiring on the first days of April in the years thereafter.

SEC. 5. In case of any vacancy occurring in any of the boards of regents or trustees hereinbefore provided for, the appointments made to fill such vacancy shall be only for the unexpired term.

SEC. 6. In the appointment of regents and trustees, under this act, except for the Leavenworth Normal School, there shall not be at any time more than two members appointed from any one county of the State, nor shall any appointee, as referred to in this section, be vested with the right to participate in the control of more than one institution governed by the provisions of this act.

SEC. 7. The said boards of regents and trustees shall, within thirty days after official notice of their appointment, assemble at the different institutions designated under their appointment, and immediately proceed to organize their respective boards for their first fiscal year by the election of a president, vice president, treasurer and secretary, and the adoption of such rules and regulations as may be essential to an intelligent and successful administration of the affairs intrusted to their care and responsibility. The said boards of regents and trustees shall convene in regular session at least twice in a year, and in such special sessions as the exigencies of their duties may require; they shall annually make a detailed report to the Governor of all receipts and disbursements of moneys, general status and condition of the institutions, accompanied with reports and statements furnished by the officers, principals and superintendents thereof.

SEC. 8. Regular and special meetings of any board of regents or trustees may be called by the secretary on the order of the president, or written petition of two members of the board. Four members of any board of regents or trustees shall constitute a quorum for the transaction of business.

SEC. 9. The compensation of regents and trustees shall be three dollars per diem, and mileage at the rate of ten cents per mile for actual distance traveled by the most practicable and direct route.

SEC. 11. Whenever any vacancy or vacancies shall occur in any board of regents, trustees or commissioners hereinbefore provided for, at a time when the Legislature is not in session, the Governor shall appoint some person or persons to fill such vacancy, but such appointment shall not continue longer than the third week after the next session of the Legislature convenes.

SEC. 12. There shall be a commission of three citizens of the State of Kansas appointed by the Governor and confirmed by the Senate, who shall hold their office for the term of three years, and who shall be in no wise connected with either of the institutions herein named, who shall be a visiting committee, to make at least two visits in each year to the following State institutions: The State Penitentiary, the Insane, Deaf and Dumb, and Blind Asylums, the State University, the State Agricultural College, the State Normal Schools at Emporia and Leavenworth. They shall each have power to administer oaths and send for persons and papers to examine into the financial condition and the general conduct of said institutions; and they shall make a report to the Governor in writing, at the end of each fiscal year, of the financial condition and the general conduct of each of said institutions, their necessities and requirements, and such other recommendations as they may deem best for the proper conduct of said institutions, and for the public good. They shall receive for their services the sum of three dollars per day, and ten cents for each mile traveled by the most direct and practicable route.

SEC. 13. All boards of regents and trustees as are herein designated shall be empowered as boards of control, with full and complete power to adopt and enforce all necessary rules and regulations required under the law for the government of said institution. They shall make all appointments of officers, principals, teachers and employés which may be required for the practical and economical management thereof.

SEC. 14. All parts of acts in conflict with the provisions of this act be and the same are hereby repealed.

SEC. 15. This act shall take effect and be in force from and after its publication once in the *Kansas Daily Commonwealth.*

Approved March 6, 1873.

Section 12 repealed by act approved February 25, 1875.
Sections 3, 4, 6, 7 and 8 repealed by act approved March 4, 1876.
Sections 3 and 4 relate to asylums only.
Section 10, having no application to the College, was repealed by act approved March, 1874.
Section 7 amended by act approved February 15, 1877.

[*Took effect April 3, 1873.*]

AN ACT to create a State Board of Education.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. There shall be a State Board of Education, consisting of the State Superintendent of Public Instruction, the Chancellor of the State University, the President of the State Agricultural College, and the principals of the State Normal Schools at Emporia and Leavenworth. . . .

Approved March 6, 1873.

[*Took effect March 4, 1875.*]

AN ACT to repeal section twelve of an act entitled "An act to provide for the appointment of regents and trustees for the control of the public institutions of the State, and defining certain powers thereof," being chapter one hundred and thirty-five, session laws of eighteen hundred and seventy-three.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That section twelve of the act entitled "An act to provide for the appointment of regents and trustees for the control of the public institutions of the State, and defining certain powers thereof," being chapter one hundred and thirty-five of the session laws of eighteen hundred and seventy-three, be and the same is hereby repealed.

SEC. 2. This act shall take effect and be in force from and after its publication in the *Kansas Weekly Commonwealth.*

Approved February 25, 1875.

[*Took effect March 10, 1876.*]

AN ACT to authorize the Board of Regents of the State Agricultural College to use the endowment fund of said College for the purpose of paying taxes on, and redeeming from sale, lands heretofore sold by said College, which have been sold for taxes.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That the Regents of the State Agricultural College are hereby authorized to use of the endowment fund of said College a sufficient amount to pay taxes due on lands heretofore sold by said College, and, where lands so sold have been sold for taxes, to redeem the same from sale.

SEC. 2. This act shall take effect and be in force from and after its publication in the *Commonwealth.*

Approved March 3, 1876.

See act approved March 5, 1877.

[*Took effect March 10, 1876.*]

AN ACT to amend sections three, four, six, seven and eight of chapter one hundred and thirty-five of the laws of eighteen hundred and seventy-three, being "An act to provide for the appointment of regents and trustees for the control of the public institutions of the State," approved March 6, 1873.

Be it enacted by the Legislature of the State of Kansas:

SEC. 3. That section six of chapter one hundred and thirty-five of the laws of eighteen hundred and seventy-three be and the same is hereby amended so as to read: Sec. 6. In the appointment of regents and trustees under this act, except for the Leavenworth Normal School, there shall not be at any time more than two members appointed from any one county of the State, nor shall any trustee be appointed residing in the county in which any charitable institution is located; and the removal of such trustee into the county in which such institution is located shall vacate his office.

SEC. 4. That section seven of chapter one hundred and thirty-five of the laws of eighteen hundred and seventy-three be and the same is hereby amended so as to read: Sec. 7. The said boards of regents shall, within thirty days after official notice of their appointment, assemble at the different institutions designated under their appointments, and immediately proceed to organize their respective boards for their first fiscal year by the election of a president, vice president, treasurer and secretary from their own number, and the adoption of such rules and regulations as may be essential to an intelligent and successful administration of the affairs intrusted to their care and responsibility. The said board of trustees shall, within thirty days after official notice of their appointment, assemble at the State capitol and immediately proceed to organize by the election from their own number of a president, secretary and treasurer, and the adoption of such rules and regulations as may be essential to an intelligent and successful administration of the affairs intrusted to their care and responsibility. The said board of trustees shall convene in regular session at least twice a year, and in such special sessions as the exigencies of its duties may require; they shall annually make a detailed report to the Governor of all receipts and disbursements of moneys, general status and condition of the institutions, accompanied with reports and statements furnished by the officers, principals and superintendents thereof.

Sec. 5. That section eight of chapter one hundred and thirty-five of the laws of eighteen hundred and seventy-three be and the same is hereby amended so as to read: Sec. 8. Regular or special meetings of any board of regents or trustees may be called by the secretary thereof on the order of the president, or with the petition of two members of the board. Four members of any board of regents or three members of the board of trustees shall constitute a quorum for the transaction of business.

Sec. 6. Sections three, four, six, seven and eight of chapter one hundred and thirty-five of the laws of eighteen hundred and seventy-three are hereby repealed.

Sec. 7. This act shall take effect and be in force from and after its publication in the *Commonwealth*.

Approved March 4, 1876.

Sections 1 and 2 refer to asylums.
Section 4 amended by act approved February 15, 1877.

[*Took effect March 13, 1877.*]

An Act to provide for the refunding of certain taxes assessed and paid on certain lands known as "State Agricultural College lands."

Be it enacted by the Legislature of the State of Kansas:

Section 1. The county commissioners of the several counties in this State in which are located any of the lands known as the Agricultural College lands, which have been assessed for taxation and on which no taxes have been paid, and which said lands have been sold and bid off by the county at the several sales of land in said counties for delinquent taxes, are hereby authorized to require a certificate of the amounts of said taxes, with costs and expenses of sales up to and including the year A. D. eighteen hundred and seventy-five, to be made by the county clerks of said counties, which said certificate shall be forwarded to and duly filed and preserved in the office of the Auditor of State; and when received by said Auditor, and when he is satisfied of its correctness in all respects, he shall give the county so forwarding said certificate a credit on his books for the amount of such taxes and costs and expenses of sale.

Sec. 2. It shall be the duty of the board of county commissioners of the several counties in which said lands are located and assessed, to refund to the persons who have paid their taxes upon said lands up to and including the year A. D. eighteen hundred and seventy-five, the amount of the taxes so paid by them, as evidenced by the original tax receipts; and when said payments shall have been made, a certificate thereof, with the original tax receipt, shall be made to the Auditor of State, and when that officer is satisfied that said taxes have been refunded and the amount thereof, it shall be his duty, and he is hereby authorized, to draw his warrant on the State Treasurer in favor of said board of county commissioners for the amount thereof, which said warrant shall be paid by the Treasurer of State out of the money hereby specifically appropriated by this act for that purpose.

Sec. 3. In case any of such lands shall have been sold for taxes, and any person holding a tax deed therefor, or a certificate of tax sale therefor, and may desire to cancel and surrender said tax deed, or certificate of tax sale, it shall be the duty of the board of county commissioners of the county in which such lands are located to pay to such person so surrendering and canceling his tax deed, or certificate of tax sale, the amount thereof and the interest on said amount at the rate of twelve per cent. per annum; and in case of such payment, the amount thereof shall be certified to the Auditor of State, who shall issue his warrant in favor of said board of county commissioners making such payment for the amount thereof; and it is hereby made the duty of the Treasurer of State to pay said warrant.

Sec. 4. The sum of five thousand dollars, or as much thereof as may be necessary, is hereby appropriated out of the endowment fund of the Agricultural College to carry into effect the provisions of this act.

Sec. 5. This act shall take effect and be in force from and after its publication in the *Commonwealth.*

Approved March 5, 1877.

This act expired by limitation of time during which any appropriation is available, June 30, 1879.

[*Took effect March 14, 1877.*]

An Act providing for the turning in to the State Treasurer of public moneys, and prescribing the duties of the Treasurer and Auditor of State in keeping account of the same, and to repeal section two of an act entitled "An act amendatory of and supplementary to chapter three of the General Statutes, relating to the Agricultural College," approved March 2, 1871.

Be it enacted by the Legislature of the State of Kansas:

Section 1. All public moneys received from any source except from State Treasurer, on appropriation made by the Legislature, by the Warden of the State Penitentiary, Regents of the State University, Agricultural College Directors, Normal School Trustees, or other officer of any State institution' or department authorized by law to receive and disburse moneys on account of the State, shall be turned over to the State Treasurer on or before the fifteenth day of each month succeeding the one in which the said moneys are received, except at the close of the fiscal year, at which time such returns shall be made on or before the close of said fiscal year, taking duplicate receipts of the State Treasurer for the same, one of which shall be delivered to the Auditor of State, together with the sworn statement of the officer so depositing, setting forth the source from which such moneys are received, and that no other than the moneys so deposited with the Treasurer have been received by him during the period covered by said statement, and the other filed in the office of the institution or department.

Sec. 2. The Treasurer of State and the Auditor of State shall keep an account of all moneys received as specified in section one of this act, and place it to the credit of such institution or department from which it was received; and the moneys so received by the State Treasurer shall become a part of the general revenue of the State: *Provided*, That nothing in this act shall be construed to prevent the use of the endowment or other contingent funds of any educational institution by the respective boards of regents, until the same shall be appropriated by law.

Sec. 3. That section two of an act entitled "An act amendatory of and supplementary to chapter three of the General Statutes, relating to the Agricultural College," approved March second, eighteen hundred and seventy-one, be and the same is hereby repealed.

SEC. 4. All acts or parts of acts in confliction with this act are hereby repealed.

SEC. 5. This act shall take effect and be in force from and after its publication once in the *Daily Commonwealth.*

Approved March 6, 1877.

This act failed to provide for funds of the College, from various imperfections, and is supplanted by act approved March 6, 1883.

[*Took effect March 17, 1877.*]

AN ACT to authorize the Regents of the State Agricultural College to issue the bonds of said College for certain purposes.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That the Regents of the Kansas State Agricultural College be and they are hereby authorized and empowered to issue the bonds of said Agricultural College, to the amount of eleven thousand dollars. Said bonds shall be issued in denominations of one thousand dollars each, and shall be signed by the chairman of the Board of Regents, and attested by the secretary of the said Board of Regents, with the seal of said Agricultural College. The bonds issued under the provisions of this act shall be issued and dated on the thirtieth day of June, A. D. eighteen hundred and seventy-seven, and one bond shall become due and payable on the thirtieth day of June of each year following, as follows: Eighteen hundred and seventy-eight, eighteen hundred and seventy-nine, eighteen hundred and eighty, eighteen hundred and eighty-one, eighteen hundred and eighty-two, eighteen hundred and eighty-three, eighteen hundred and eighty-four, eighteen hundred and eighty-five, eighteen hundred and eighty-six, eighteen hundred and eighty-seven, eighteen hundred and eighty-eight. The bonds issued under the provisions of this act shall have interest coupons attached, which said coupons shall be signed in the same manner as the bonds are signed, and shall be made in the sum of one hundred dollars each.

SEC. 2. The Regents of said Kansas State Agricultural College shall annually set apart and appropriate out of the interest on the endowment fund of said College, a sum sufficient to redeem the maturing bonds, and to pay the interest on the same, and the accrued interest on the outstanding bonds; and whenever any bond or coupon is redeemed and paid, the same shall be canceled.

SEC. 3. These bonds shall be issued for the sole purpose of raising a fund for the purpose of paying off and redeeming certain warrants issued by the Regents of said Agricultural College in the year eighteen hundred and seventy, under the provisions of chapter nineteen, laws of eighteen hundred and seventy, being an act entitled "An act to aid in the development of the Kansas State Agricultural College," approved March first, eighteen hundred and seventy.

SEC. 4. It shall be the duty of the Board of Regents of the said Kansas State Agricultural College, and they are hereby directed, to invest the endowment fund of said Agricultural College in the bonds issued under the provisions of this act, at their par value; and the funds raised from the sale of said bonds shall be applied in the payment of said Agricultural College scrip as fast as the same becomes due, and shall be used for no other purpose.

SEC. 5. This act shall take effect and be in force from and after its publication in the *Commonwealth.*

Approved March 6, 1877.

See appropriation act of 1881.

[*Took effect March 20, 1879.*]

An Act in relation to State departments, the powers and duties of State officers, the official State paper, and the great seal of the State, and defining certain crimes and providing punishment therefor.

Be it enacted by the Legislature of the State of Kansas:

Section 113. The State Superintendent of Public Instruction, Secretary of State, and Attorney General, shall constitute a board of commissioners for the management and investment of the State permanent school, State Normal School and State University. Such board shall be organized, etc. . . .

Sec. 116. They shall also keep such other books as may be necessary to properly register and describe all bonds offered to them and all bonds bought by them for the benefit of the permanent school, State Agricultural College, State Normal School and State University funds, or either. Such record books shall be ruled so as to enable the board to register the name and residence of the person offering to sell any such bond or bonds, the name or residence or location of the owner or district from whom such offer is made, and a full detailed description of every bond, whether United States, State or school district, and the date, number, series, amount and rate of interest of each bond, and when the interest and principal, respectively, are payable; and such record shall be made of every such bond before the board shall act upon the question of purchasing such bond.

Sec. 117. Said board of commissioners shall have the power, and it is hereby made their duty, from time to time to invest any moneys belonging to the permanent school fund, State Agricultural College, State Normal School and State University funds in bonds of the State of Kansas or of the United States, and school-district bonds of the several school districts of Kansas. In making such investments, they shall give preference to the bonds of the State of Kansas and school-district bonds, whenever the same can be procured most advantageously to the said funds; but they shall not pay for any State or school-district bonds in any case a greater sum than the par value of the same, nor shall they pay for any such bonds any greater sum than the actual market price thereof at the time of purchasing the same.

As the funds of the State Agricultural College were not placed in the State treasury, and as no other sections of this act applied to the Agricultural College funds, it was impossible to make sections 116 and 117 apply. For later provision for these funds, see act approved March 6, 1883.

[*Took effect March 7, 1883.*]

An Act relating to the investment of the funds arising from the sale of State Agricultural College lands, and repealing certain acts and parts of acts inconsistent with this act.

Be it enacted by the Legislature of the State of Kansas:

Section 1. All moneys, bonds, mortgages, promissory notes, or other evidences of indebtedness due or belonging to the endowment fund of the State Agricultural College, now in the hands of the Treasurer, Loan Agent or Land Agent of said State Agricultural College, are hereby ordered turned over to the Treasurer of the State of Kansas on or before April 1, A. D. 1883. The officer or officers delivering such securities shall take receipts therefor in triplicate. One of said receipts shall be filed with the Auditor of State, one with the Board of Regents, and one to be retained by the officer making such payments. The Treasurer of State shall be responsible on his official bond for all sums of money, securities, bonds or other valuable things which may come into his hands by virtue of this act, and shall at the close of each month make to the secretary of the Board of Regents a detailed statement of collections and disbursements, and the condition of such funds belonging to said College.

Sec. 2. The Board of Regents shall appoint a Loan Commissioner, whose duty it shall be to make investments of the funds belonging to the said Agricultural College. The Board of Regents shall adopt rules and regulations under the provisions of this act, prescribing the kind and the manner in which all bonds and investments shall be made by said Loan Commissioner. He shall keep an accurate account, in a book kept for that purpose, of all loans and investments. He shall draw his warrant upon the Treasurer of State for such sums as he may loan or invest, specifying in the warrant to whom the same is payable. The President of the College and Secretary of the Board of Regents of the Agricultural College shall approve all loans and investments made, and with the Loan Commissioner shall sign all warrants issued on the State Treasurer. The Loan Commissioner shall draw no warrant except for loans and investments, and separate warrants shall be drawn for each loan or investment. All loans or investments shall be made in the name of Kansas State Agricultural College, and all principal and interest shall be payable at the office of the State Treasurer.

SEC. 3. The interest accruing on the investments of the State Agricultural College funds, and the interest paid upon the sales of Agricultural College lands, shall be paid over to the Treasurer of the State Agricultural College by the State Treasurer, upon the warrant of the President of the Board of Regents, attested by the Secretary.

SEC. 4. The agent for the sale of State Agricultural College lands shall, on or before the fifth day of each month, pay over to the State Treasurer all money received by him on account of sales of said lands or collections on prior sales for the month preceding. At the time of making such payments said Land Agent shall deliver to the Auditor of State, and also to the Secretary of the Board of Regents, a detailed statement, duly certified under his hand, showing the number of acres and descriptions of the lands sold, by whom purchased and the price per acre, and all collections on prior sales, for the month on which payments are made to the State Treasurer.

SEC. 5. Section three, section four, section nine,* of chapter thirteen, Session Laws of 1871, and all acts or parts of acts inconsistent with this act, are hereby repealed.

SEC. 6. This act shall take effect and be in force from and after its publication in the official State paper.

Approved March 6, 1883.

* This refers to section nine of act approved February 22, 1866.

[*Took effect March 5, 1885.*]

AN ACT authorizing the Board of Regents of the Kansas State Agricultural College to purchase additional land for experimental farm.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That the Board of Regents of the Kansas State Agricultural College be authorized to purchase additional land for experimental purposes out of the income fund of said College, not exceeding ten per cent. of the amount derived from the endowment fund of said institution for the year eighteen hundred and eighty-four and eighteen hundred and eighty-five.

SEC. 2. The Board of Regents of said College shall make a report to the Legislature of all lands purchased under the authority of this act, at its next session.

SEC. 3. This act shall take effect and be in force from and after its publication in the official State paper.

Approved March 4, 1885.

SUMMARY OF MANAGEMENT

UNDER LAW, REGULATION, AND PRECEDENT.

The Board of Regents is constituted by appointment of six members, two each year for a term of three years from the first day of April, and the addition of a seventh member *ex officio* in the President of the College. Appointments are made by the Governor with approval of the Senate, and appointees to fill vacancies when the Senate is not in session hold place no longer than to the third week of the next session of the Legislature.

Board Meetings are held quarterly, in April, July, October and January, with an extra meeting at the annual commencement in June; but the time of these meetings is varied by direction of the Board, and special meetings are called by order of the President or on petition of two members. At the quarterly meetings all accounts current are audited, and the first evening session is made a joint meeting of Board and Faculty for consultation over the condition and needs of the several departments.

The Officers of the Board — a president, vice president, secretary and treasurer — are chosen from among the members by ballot, on the first Tuesday of April in each year. The Loan Commissioner is chosen for each fiscal year at the same meeting of the Board. The Land Agent is appointed at the pleasure of the Board.

Standing Committees are appointed annually upon employés, finances, buildings and grounds, agriculture, and horticulture, which report at pleasure upon the interests in charge.

Compensation for Appointed Members, fixed by law, is a per diem of three dollars during actual service and mileage of ten cents for actual travel. It is paid by the State upon sworn statement with the certificate of the secretary as to correctness.

The Biennial Report to the Governor presents full annual reports of all the officers and of each member of the Faculty.

The Lands are sold for cash or upon contract in eight equal annual installments, one paid at the time of sale and the rest on or before the date named. These contracts are signed for the College by the agent, countersigned by the secretary, with the seal of the College attached. These contracts are forfeited upon failure to make payments as agreed, but the Board may extend the time of payment of principal upon prompt payment of interest, in which case a notice from the secretary of such extension is filed with the State Treasurer.

The Funds, aside from land contracts, are invested by the Loan Commissioner, with approval of the president and secretary, in bonds not negotiable, and deposited in the State treasury, where all collections of principal and interest are made. Upon any payment of principal or interest, the State Treasurer issues a descriptive receipt in triplicate, the first copy of which goes to the payer, the second to the Auditor of State, and the third to the secretary of the Board of Regents. The State Treasurer also gives triplicate receipts for all securities deposited, and reports monthly the total receipts and disbursements on account of each fund, and the balances of cash and securities on deposit. All expenditures are made under direct authority from the Board.

The endowment fund is drawn for investment by warrants of the Loan Commissioner, countersigned by the president of the College and secretary of the board, specifying each particular investment. The income fund is drawn, for current expenses only, by warrant issued to the treasurer of the College, signed by the president of the board and attested by the Secretary, with the College seal attached.

Appropriations are drawn by warrant of the Auditor of State, issued upon an itemized statement of bills rendered, certified by the secretary and sworn to by the treasurer.

THE TREASURER, who gives a bond of $25,000, deposited with the secretary, keeps an itemized cash account of receipts and disbursements, and reports monthly and annually to the secretary. For all collections other than those from the State treasury, he issues duplicate receipts, one of which is filed with the secretary. All disbursements are made upon duplicate vouchers in itemized account, approved by the superintendent of department where the expenditure is made — who retains a triplicate — certified to by the secretary, and allowed, after auditing in full board, by the president of the board. When completed and receipted, the original is retained by the treasurer, and the duplicate filed with the secretary.

THE LAND AGENT, who gives a bond of $10,000, approved by the Governor and deposited with the Secretary of State, makes all contracts of sale in duplicate, according to law, keeps a full transcript of all contracts and record of sales, and makes monthly reports to the State Auditor, the State Treasurer, and the secretary of the College. He also reports to the Board quarterly and annually. His services are paid by commission fixed by law through appropriation from the State treasury.

THE LOAN COMMISSIONER, who gives a bond of $5,000, deposited with the secretary, keeps full descriptive account of all bonds purchased, and reports monthly and annually to the secretary of the Board, the amount and kind of securities purchased and deposited in the State treasury.

THE SECRETARY, with an assistant named by the Board, preserves full records of Board meetings, files all correspondence, reports, bond papers and vouchers in the College vault, and keeps the following accounts:

1. *A voucher record*, in which are entered by dates of bill, of filing, of auditing and of payment, by a file number, and by the name of the payee, all bills rendered against the several departments of the College. This account is verified by cross-addition every month, and closed into —

2. *Monthly accounts* of receipts and expenditures of the income fund, and the several appropriations from the State for buildings or improvements. These also include the data of reports from the several officers of the College and the State Treasurer.

3. *Land Sales*, a record of date, purchaser and terms of sale, for each quarter-section of land, made upon countersigning the contract, and including a memorandum of contracts showing payments due each month, and date of issue of patent on final payment.

4. *Land Ledger*, a distinct account with each contract, showing each payment of interest or principal shown by triplicate receipts from the State Treasurer.

5. *Bond Ledger*, a series of books giving a complete record of each bond with coupons, and entry of each payment shown by triplicate receipt of the State Treasurer.

6. *With State Treasurer*, showing date, number and amount of each triplicate receipt classified as to sources of income or kind of investment reduced; also date, number and amount of each warrant against either fund, and disbursements made and securities deposited. This account is closed monthly, after verification with the monthly report of the State Treasurer, and results are carried to —

7. *Monthly Balances*, preserving the exact condition of all funds and offices at the close of each month. A transcript of this account is published each month in the *Industrialist*.

8. *Inventory* of all property of the College in itemized detail, revised and recopied at the close of each fiscal year.

The secretary makes an annual report embodying the facts shown by all these accounts, which is published in the *Industrialist* as well as in the biennial report of the Regents. An abstract of proceedings of each board meeting is also given to the public through the *Industrialist.*

THE FACULTY, composed of all the professors, instructors and superintendents, manages the details of discipline, instruction and maintenance of growth. The members appointed by the Board, after satisfactory trial, hold their several places till resignation or removal for cause, with due notice on either side, and all annual salaries are named for the college year of instruction beginning with the first day of September.

Meetings are held weekly during term-time, and standing committees assist in executive duties. Each head of department keeps full accounts of receipts and expenditures, and closes accounts with a complete inventory at the end of the fiscal year. Annual reports are made to the Board of all work carried on and instruction given.

The secretary of the Faculty keeps full records of all transactions and a record of each student's course from entrance to close.

STUDENTS, upon application for admission, fill a blank for full name, age, post office, county and State, and native State, proposed course, chosen occupation, means of support, and the address and business of parents. After examination by a committee, with grades upon a scale of 100, each is assigned to classes by the president, with a record of duties and boarding place, and enrolled by the secretary; after which enrollment, changes are made or excuses granted only by consent of the Faculty. A daily record of attendance and accomplishment is kept for each class, and absence without excuse, or deficiency of any kind, is reported at the regular Faculty meeting of each week.

GRADES OF SCHOLARSHIP are reported by each instructor upon a scale of 100, from the daily record of the class book and the regular examinations; and after recording each examination in the student's record, where a single page shows all the work of a student from his entrance, the secretary sends to parents a transcript of standing in classes for the period covered.

RULES OF CONDUCT are all embraced in the essentials of manly and womanly character.

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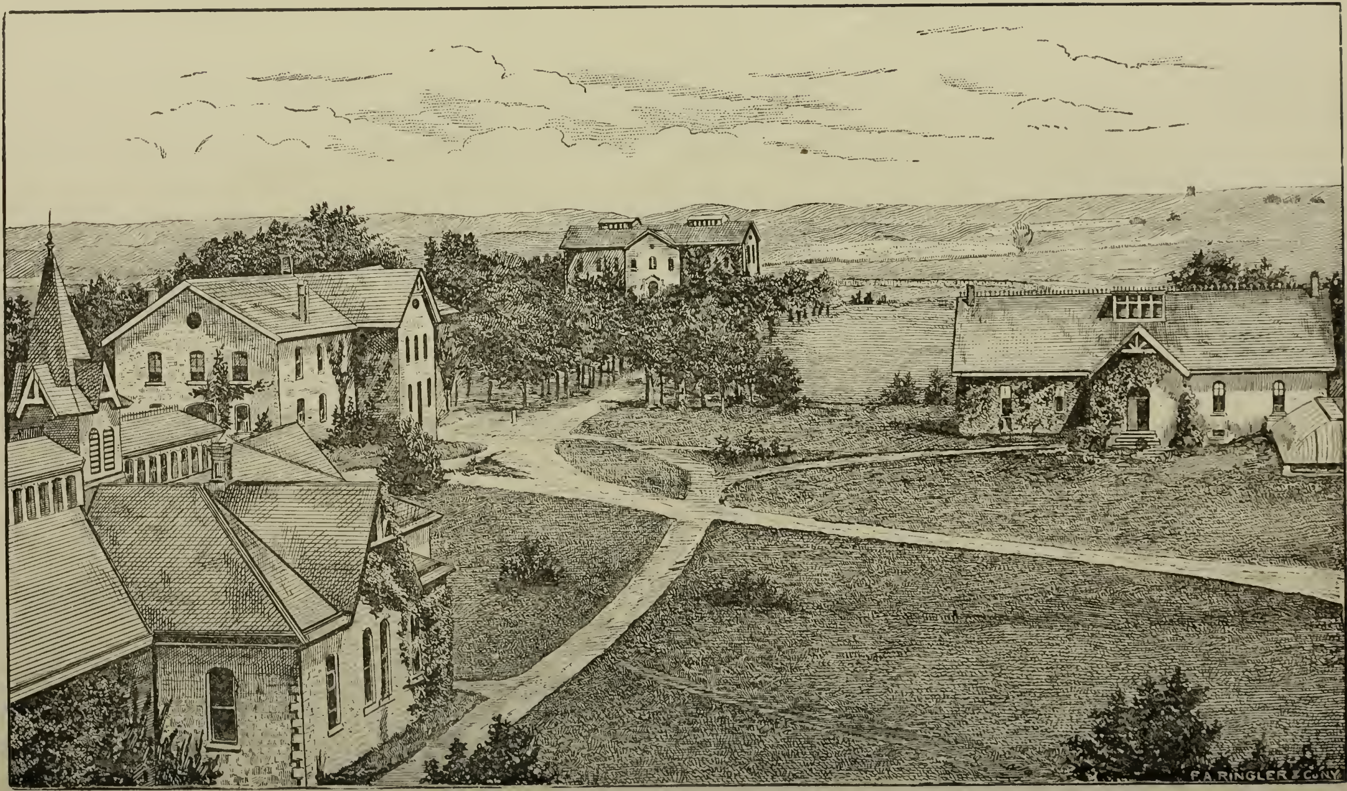
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Chemical Laboratory. Mechanics' Hall. Museum. Horticultural Hall.

KANSAS STATE AGRICULTURAL COLLEGE.—VIEW FROM MAIN BUILDING NORTH.

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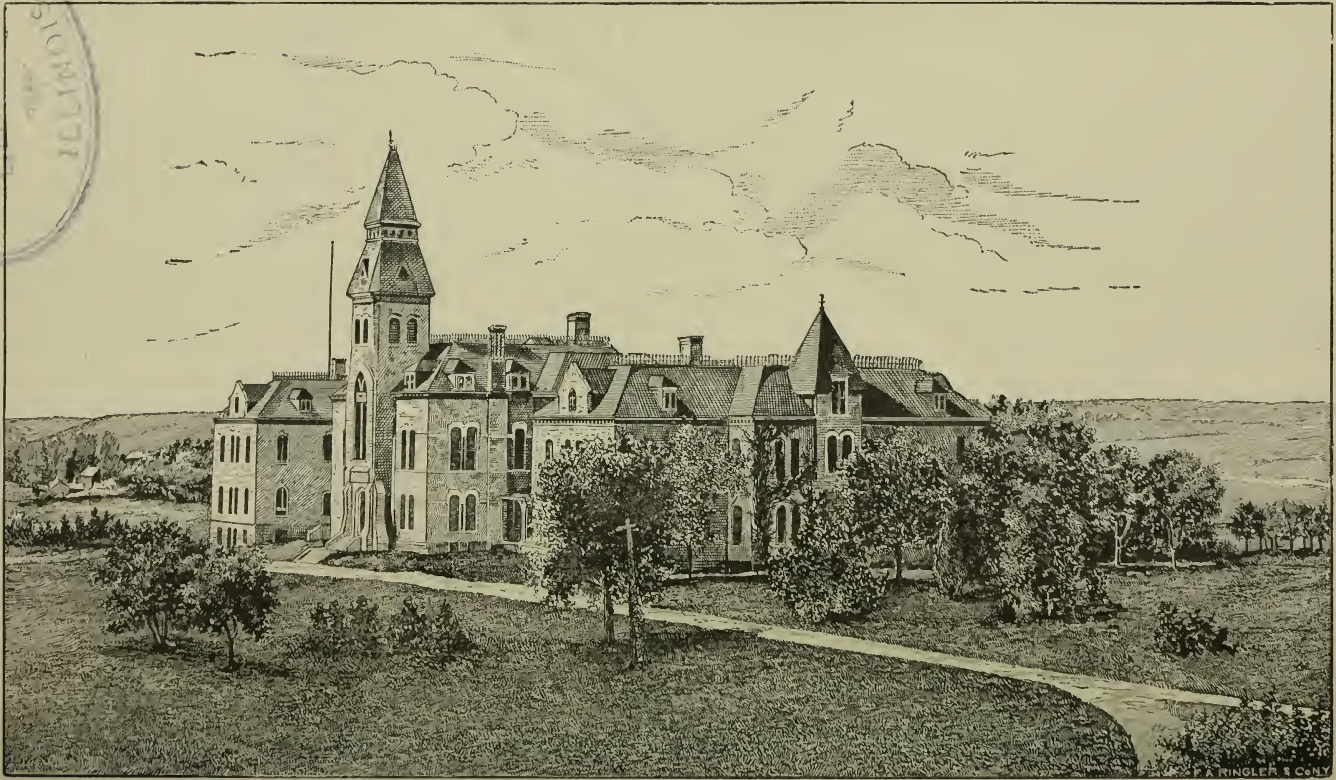
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STATE AGRICULTURAL COLLEGE,
MANHATTAN, KANSAS.

SIXTH BIENNIAL REPORT

OF THE

REGENTS AND FACULTY.

1887-8.

WITH APPENDIX.

TOPEKA.
KANSAS PUBLISHING HOUSE: CLIFFORD C. BAKER, STATE PRINTER.
1888.

BOARD OF REGENTS.

Hon. A. P. FORSYTH (1891),* President	Liberty, Montgomery Co.
Hon. E. N. SMITH (1889), Vice-President	El Dorado, Butler Co.
Hon. JNO. E. HESSIN (1889), Treasurer	Manhattan, Riley Co.
Hon. T. P. MOORE (1890), Loan Commissioner	Holton, Jackson Co.
Hon. THOS. HENSHALL (1890)	Kansas City, Wyandotte Co.
Hon. JOSHUA WHEELER (1891)	Nortonville, Jefferson Co.

Pres. GEO. T. FAIRCHILD, (*ex-officio*) Secretary.

I. D. Graham, *Assistant Secretary*, Manhattan.

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* Term expires.

Kansas State Agricultural College,
Manhattan, Kas., Dec. 10, 1888.

To His Excellency Governor Jno. A. Martin:

Dear Sir — I transmit herewith, under the laws of the State, the sixth biennial report of the Board of Regents of the Kansas State Agricultural College, including the annual reports of the President, professors and other officers, for the years ending June 30, 1887, and June 30, 1888.

Respectfully yours,
Geo. T. Fairchild,
Secretary Board of Regents.

KANSAS STATE AGRICULTURAL COLLEGE.

REGENTS' REPORT.

To His Excellency JOHN A. MARTIN, *Governor of the State of Kansas:*

SIR—The Regents of the State Agricultural College respectfully submit this, their sixth biennial report, for the two years ending June 30, 1888, appending reports from all departments, showing the growth, present condition and general work of the College. The two years have shown improvements in keeping with the general improvements of the State. The grounds, already planted with a considerable variety of trees, have become by their growth and development an ornament to the State, and promise to become as beautiful as any in the country.

The appropriations for the improvement of buildings in various ways have been used as contemplated, very much to the advancement of the interest of the College. The enlargement of the chapel provided for by the appropriation of $3,500 has added about two hundred to the seating capacity, and has made the room one of the pleasantest for the purposes intended, to be found anywhere. The appropriation for blinds for College Hall has given the whole building a neat and wholesome appearance as well as added comfort and convenience in its use for recitations and laboratory work.

The cases contemplated for the general museum, for the mineralogical cabinet and for storing apparatus have been built after very satisfactory plans furnished by the Superintendent of the Mechanical Department, with suggestions from the Professor of Industrial Art and Designing, and are an ornament as well as a convenience.

The several departments have expended appropriations for apparatus as provided by the last Legislature, making a very considerable improvement in the equipments; this is especially true in the Mechanical Department and the Department of Physics; both are now in condition to do good work, and with moderate additions from year to year will keep up with the times and the growth of the State.

Detailed accounts of expenditures from the several appropriations, as required by law, will be found in the report of the Secretary.

The annual enrollment of students has increased within the two years past from a total of 428 to an average of 475, although the requirements for admission have been somewhat increased, to accord with the better condition of the schools of the State. Full details of the attendance, with the list of counties represented and the classification of students, will be found in the reports of the President. The requirements are such, still, as to make it possible for any student in an ordinary district school to meet them in full.

The Faculty of instruction has had but few changes, all of which are reported by the President, and most of the Professors are those who have already won a name and reputation in the State. The names, the titles and salaries paid are given below:

	Experiment station fund ...	*College fund*......	*Totals*.........
(*1*) George T. Fairchild, A.M., President, Professor of Logic and Political Economy, Secretary of Board, and Chairman of Station Council	$500	$2,500	$3,000
(*1*) Edward M. Shelton, M.Sc., Professor of Agriculture, Superintendent of Farm, and Director of Station	1,500	700	2,200
George H. Failyer, M.Sc., Professor of Chemistry and Mineralogy, and Station Chemist	925	925	1,850
Edwin A. Popenoe, A.M., Professor of Horticulture and Entomology, Superintendent of Orchards and Gardens, and Station Horticulturist	925	925	1,850
William A. Kellerman, Ph.D., Professor of Botany, and Station Botanist	925	925	1,850
David E. Lantz, M.Sc., Professor of Mathematics		1,400	1,400
John D. Walters, M.Sc., Professor of Industrial Art and Designing		1,400	1,400
Ira D. Graham, B.Sc., Secretary, Superintendent of Telegraphy, Instructor in Book-keeping, and Assistant Secretary of Board	400	1,400	1,800
Mrs. Nellie S. Kedzie, M.Sc., Professor of Household Economy and Hygiene,		1,000	1,000
Mrs. Elida E. Winchip, Superintendent of Sewing		800	800
Ozni P. Hood, B.Sc., Instructor in Mechanics and Engineering, and Superintendent of Workshops		1,200	1,200
(*2*) Alexander B. Brown, A.M., Professor of Music		500	500
John S. C. Thompson, Superintendent of Printing		1,000	1,000
(*4*) John F. Morrison, Lieutenant 20th U.S. Infantry, Professor of Military Science and Tactics			
Frederick J. Rogers, M.Sc., Instructor in Physics		900	900
Robert F. Burleigh, M.D., D.V.S., Professor of Physiology and Veterinary Science	1,000	600	1,600
Francis H. White, A.B., Instructor in History and Constitutional Law		1,200	1,200
ASSISTANTS AND FOREMEN.			
J. T. Willard, M.Sc., Assistant in Chemistry	1,200		1,200
C. M. Breese, B.Sc., Assistant in Chemistry		720	720
J. G. Harbord, B.Sc., Assistant Librarian		720	720
C. L. Marlatt, M.Sc., Assistant in Entomology	800		800
H. M. Cottrell, M.Sc., Assistant in Agriculture	800		800
Wm. Shelton, Foreman of Farm	800		800
S. C. Mason, Foreman of Gardens	800		800
Wm. Baxter, Foreman of Greenhouse		720	720
C. A. Gundaker, Foreman of Blacksmith Shop		600	600
W. L. House, Foreman of Carpenter shop		720	720
(*3*) A. C. McCreary, Janitor		600	600
W. T. Swingle, Assistant in Botany	320		320
Totals	$10,895	$22,855	$33,750

(*1*) With house.
(*2*) With fees from instrumental lessons.
(*3*) With house, fuel, and lights.
(*4*) Detailed by order of the War Department without extra pay, except by special arrangement for extra teaching outside the Military Department.

COURSE OF STUDY.—The four-years course of study for young men and young women remains essentially what it has been for the past eight years with only slight changes for adjustment to new requirements in the management of the College. All students receive instruction in the elements of English, mathematics, and the natural sciences related to Agriculture and Mechanic arts; all pursue also the study of agriculture, or domestic economy and hygiene, and horticulture. Every student is required in connection with the course of study, to take some training in one of the Industrial arts provided for at the College; all young men are required to take one term's training with wood-working tools in their first year, one term on the farm and gardens during the second year, and one term in the same place during the third year. In other parts of the course a choice may be had between either of these and printing, telegraphy, or blacksmithing. The young women are required to have one term's training in the sewing rooms during the first year, and one term in the kitchen laboratory and one in the dairy during the second year. At other times they may choose between these and printing, telegraphy, floriculture, or instrumental music. In connection with their regular course, students may at their option receive instruction in vocal music, free of charge, or instrumental music at a moderate price for lessons, and in Military tactics as provided by law, but such duties must not conflict with progress in other studies. The regular course of four years is shown in brief below, full details being given in the annual catalogue. Added years of experience have confirmed the authorities in their judgment as to the requirements for such a course of study, and the general judgment of educators is in accordance with the plan. Improved methods are continually employed with better facilities from year to year in carrying out the plan of study with the industries, and the College is esteemed one of the most successful in its line to be found in the country. Many interested visitors from other States have examined its methods with reference to adoption elsewhere, and the people in the State have given it their cordial indorsement and patronage.

Each student is expected to take three studies, besides one hour's practice in an industrial art, and variations from this rule can be made only with the consent of the Faculty.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following gives the general scope of the two, but fuller explanations are found under Outline of Instruction in the Annual Catalogue:

FIRST YEAR — FALL TERM.

Arithmetic.
English Analysis.
Geometrical Drawing.
  Industrial.

WINTER TERM.

Book-keeping.
English Structure.
United States History.
Free-hand Drawing three times a week.
  Industrial.

SPRING TERM.

Algebra.
English Composition.
Botany.
  Industrial (Carpentry or Sewing.)

SECOND YEAR — FALL TERM.

Algebra completed.
Elementary Chemistry.
Horticulture.
  Industrial.

WINTER TERM.

Geometry.
Agriculture or Household Economy.
Organic Chemistry and Mineralogy.
Twelve lessons in Military Science.
  Industrial (Cooking.)

SPRING TERM.

Geometry completed, Projection Drawing.
Entomology.
Analytical Chemistry.
Eighteen lectures in Military Science.
  Industrial (Farm and Garden or Dairy.)

THIRD YEAR — FALL TERM.

Trigonometry and Surveying.
Anatomy and Physiology.
General History.
Industrial (Farm and Garden.)

WINTER TERM.

Mechanics.
Agricultural Chemistry.
Rhetoric.
Industrial.

SPRING TERM.

Civil Engineering or Hygiene.
Physics.
English Literature.
Perspective Drawing two hours a week.
Industrial.

FOURTH YEAR — FALL TERM.

Agriculture or Literature.
Physics and Meteorology.
Psychology.
Industrial.

WINTER TERM.

Logic, Deductive and Inductive.
Zoölogy and Veterinary Science.
Structural Botany.
Industrial.

SPRING TERM.

Geology.
United States Constitution.
Political Economy.
Industrial.

THE EXPERIMENT STATION.—The passage of the so-called "Hatch bill" in March, 1887, provided for the organization of a station for experiment in lines promotive of agriculture. The Legislature of the State at once designated this College as the proper place for the organization of the station proposed, and measures were taken for at once organizing for work. It was found, however, that no appropriation had been made for carrying out the provisions of the bill, and accordingly all efforts ceased until February, 1888, at which time an appropriation was made by Congress placing fifteen thousand dollars ($15,000) in the hands of the Board of Regents for use during the year ending June 30, 1888. The organization of the experiment station was at once completed and work was begun.

A full statement of the laws under which this provision is made and placed at the disposal of the Board, and of the present organization of the station with the outline of the work accomplished, will be found as an appendix to this report. The station is now well equipped with men and apparatus, and ranks among the most efficient in the country. The experimental work that has been going on at the College during many years past has given such training in the lines contemplated as will prove especially desirable under the new provision. A full and complete report of the work and financial standing of the station is required by law to be submitted to the Governor on or before the first day of February next; all details are therefore reserved for that report, which will be ready at the time named.

ENDOWMENT.— The original land grant of 82,313.53 acres has all been sold, and the amount of the endowment thus secured is $501,426.33.

This amount was on June 30, 1888, invested as follows:

School bonds, ten per cent	$5,926 00	
School bonds, seven per cent	69,618 06	
School bonds, six per cent	207,512 11	
School bonds, five per cent	1,000 00	$284,056 17
Municipal bonds, ten per cent	$3,700 00	
Municipal bonds, eight per cent	5,000 00	
Municipal bonds, seven per cent	3,200 00	
Municipal bonds, six per cent	177,100 00	$189,000 00
Land contracts, ten per cent	$21,039 03	
Real-estate contracts, eight per cent	2,250 00	
Real-estate contracts, seven per cent	1,340 00	$24,629 03
Cash uninvested		3,741 13
Grand total		$501,426 33

All of these investments without exception are believed to be good, and prompt collections of all interest accrued is secured by the State Treasurer. The average amount remaining uninvested at the close of each month during the past year has been less than $3,200. During the previous year the amount was much greater, from difficulty in finding proper securities. No losses have occurred during the two years past in either principal or interest. The average rate of interest is constantly diminishing with the improvement of the State, as has appeared in previous years, and now is barely above six per cent.

In several previous reports reference has been made to the deficiency in lands patented to the State under the original grant, amounting to 7,686.47 acres. This still valid claim has been clearly presented before the department of Interior by Hon. S. J. Crawford within the past two years, with additional proof of its character, afforded by decisions of the Supreme Court of the United States; but the Secretary of the Interior refused to reopen the case decided adversely some years ago, and the matter was brought to the attention of Congress by the introduction of a joint resolution in the House of Representatives by Hon. John A. Anderson; the resolution was favorably reported by the Committee on Public Lands, and passed both houses without objection. It granted to the State the privilege of selecting from public lands still unsold within the limits of the State the amount needed to make up the loss from the original 90,000 acres. The President, however, vetoed the resolution upon the ground that this State, having received, under the list selected, lands which fell within the limits of the railroad afterward located, might consider those lands as properly rated at double minimum, and therefore all to which it was rightly entitled. The question will again be presented to Congress, with fuller explanations, if possible, of the grounds of the claim, with the expectation that it will not again meet a similar fate.

The total amount reinvested under the care of the Loan Commissioner during the past two years is $124,212. The payment for his services has been made by an appropriation of $300 per annum. Incidental expenses connected with his office have amounted to $175.90.

In the absence of lands for sale, the Board have accepted the resignation of John B. Gifford, Land Agent, and have made no appointment in his place, since no one would be willing to file the required bond of $40,000 with no business to perform. Should forfeiture occur, or should the lands above mentioned be secured, the office will be filled. The usual commission of the Land Agent, provided by law, is due for the four years past, and the items will be presented through the Auditor of State.

INCOME.—Attention was called in the last biennial report to the fact of a diminishing income with a rapidly growing college. While the interest received from the endowment during the year ending June 30, 1886, was $38,594.89, the interest for the year ending June 30, 1887, and the year ending June 30, 1888, has been less than $32,400. While this amount is sufficient still to meet the current expenses for instruction alone, it is far from being enough to meet the necessary expenses in equipment and maintenance of the institution. From the Secretary's report it will be seen that the College expenses for the past two years have been greater than the receipts, so that instead of showing an increase, the balance is several thousand dollars on the other side of the ledger. A full statement of all accounts would show a balance in favor of the College of $4,500, and yet there is an apparent overdraft of more than ten thousand dollars ($10,000), since the collections are mostly made in July and August; thus, while the College is practically not in debt, it is much hampered in meeting current expenses for want of funds at hand to carry through from one period of collections to another, six months later.

It will be seen from this that the College is in immediate need of aid from the State to make the necessary growth in apparatus and equipments proportionate to the general growth of the State, and may need provision for incidental expenses not directly included under the term instruction. The immediate wants of the College are here presented, with confidence that the State appreciates the work already done, and will not suffer the institution to be crippled in its growth for want of anything that can be supplied at reasonable cost.

For incidental repairs of buildings the usual amount of $1,000 per annum will be needed, and special repairs will be required upon the roofs and cornices of several buildings, making additional appropriation necessary. The north wing of the main building was covered with shingles, which should be replaced with slate to correspond with the remainder of the building. Mechanics' Hall and Horticultural Hall both show immediate need of new roofs, and since both have heating boilers, safety requires that metal should be used instead of shingles. The dwelling occupied by the Superintendent of the farm, which was purchased with the farm, is in need of special repairs, both outside and in, to keep it habitable. For all these an appropriation of $2,650 would be required.

Repairs and improvements upon the steam-heating apparatus and gas supply require an expenditure of not far from $500 a year. The keeping up of furniture in so large an establishment has become a serious burden, and provision for this should be made at equal expenditure.

The Board has, in past years, several times presented the needs of the College in regard to dwellings for those officers whose duties are constant in connection with the management of the outside work. There are now upon the premises two dwellings, occupied by the President and the Professor of Agriculture. The Professor of Horticulture is equally in need of a dwelling, where he can watch the progress of his work at all hours and be responsible for the care of the grounds under his charge. The dwelling erected four years since at an expense of $4,000 is suited to his wants, both in character and location. It seems wise to ask that a dwelling suitable for the President of the College, in dimensions large enough to accommodate the necessary receptions attendant upon his duties, and in keeping with the place and surroundings, be built at once. There is also need of a plain farm dwelling, which the foreman of the farm may occupy and provide place for the necessary continuous help, that the workmen may be near their work. The estimated cost of these two dwellings is $10,000.

The Horticultural Department is in immediate need of a barn to provide storage for tools and implements, as well as a place for teams, wagons and forage. This should be of stone, and cannot be put up for less than $1,500. The farm is in need of a storage room for implements and the renewal of breeding-pens for swine, for both of which an expenditure of $950 will be needed.

The work of the College during the year past has been frequently hindered by want of sufficient water supply, the only resource being two wells and a half-dozen cisterns; frequently during the long, dry seasons the cisterns have been filled by hauling for a considerable distance, and no sufficient precaution against fire has ever been possible without a suitable increase in the water supply. The city of Manhattan has recently constructed excellent water-works, and has brought the water mains to the outside limits of the farm; an appropriation is asked for, to provide complete pipes for buildings and grounds, with suitable attachments for use in case of fire, and such a system of sewerage as shall make the water system satisfactory in maintaining general cleanliness. It is also desirable that this supply shall be available for some experiments with the small fruits and gardens in the peculiar droughts of our summer; the estimated cost is $6,000.

Tools, apparatus and fittings with some means for making collections in connection with the cabinets and museum will be needed; it seems especially desirable that provision be made for immediate collection of animals native to the State, but likely soon to be wholly driven from the State by its complete settlement. A suite of minerals for comparison should be provided for the mineralogical department, amply sufficient to secure thorough instruction in that study. A full list of the wants of the several departments in this connection will be appended to this report.

The Library has received in each of the past two years $1,000, and has made a creditable growth with this expenditure; yet from the nature of the institution in which the special sciences play a prominent part, the books of reference in the several departments are far from being equal to the demand; it seems very desirable that an increased appropriation be made for the coming two years to meet these special wants. It will be remembered that books of this character are necessarily expensive, and that a considerable numbler of standard periodicals must be provided in order that students of science may be up with the times. We ask that $2,000 a year be given for the increase of the Library.

To meet the deficiency above referred to under the funds for current expenses, the State is asked to provide for the current supply of fuel and water at an estimated cost of $3,500 a year. These items amount to a considerable sum; but most of them will bring permanent additions to the facilities of the College for doing its legitimate work, and make much more useful the annual expenditure of the funds received from the endowment.

A comparison of the amounts appropriated to this institution since its origin with those of equal repute in other States will show that Kansas has received more for the money invested than almost any other, and has been required to expend less for building and equipments than any of those States whose agricultural colleges rank with ours. The general repute of the College testifies to the proper use of the funds given in the past. Constant information as to the work of the College has been presented to the public through the weekly *Industrialist*, sent to all officers of the State and to all newspapers. Members of the Faculty have also joined in a series of Farmers' Institutes each winter, where a full discussion of questions pertaining to agriculture has been provided for. It is proposed to extend the same privileges to other portions of the State not yet visited as rapidly as is consistent with the best work of the College. At least six institutes will be held in as many different counties each winter, and in these the Professors will take a leading part. Other institutes are aided from time to time as far as is possible; but since the work of teaching must not be seriously interfered with, the number of these institutes is limited. The expense, hitherto amounting to about $300 per annum, has been met from College funds, but might properly be provided for by appropriation.

In conclusion, the Board ask the earnest attention of the Legislature to the wants above enumerated, with the assurance that a careful examination on the part of any committee would show that every dollar asked for is needed in the immediate growth of an institution which has in the past done so good work as to warrant the confidence of the people in its future accomplishment.

The Board is gratified with the abundant commendation received from all parts of the State and the Nation, and believes that any friend of industrial education will find a visit to the institution both a satisfaction and encouragement to further efforts for meeting the growing wants of the public in this direction.

Respectfully submitted.

A. P. FORSYTH.
E. N. SMITH.
JNO. E. HESSIN.
T. P. MOORE.
THOS. HENSHALL.
JOSHUA WHEELER.
GEO. T. FAIRCHILD.

MANHATTAN, NOV. 30, 1888.

The following is a concise statement of wants enumerated in the body of the report, with careful estimates of the appropriations needed to meet them:

BUILDINGS, REPAIRS, AND IMPROVEMENTS.		
President's house, complete with cistern, etc	$8,000 00	
Farm house, complete	2,000 00	
Horticultural barn and tool house	1,500 00	
Farm implement house and piggery	950 00	
New roof on north wing of College (slate)	800 00	
New roof on Mechanics' Hall (metal)	750 00	
New roof on Horticultural Hall (metal)	500 00	
Repairs, outside and in, old dwelling	600 00	
General repairs, $1,000 per year	2,000 00	
Steam and gas fitting	1,000 00	
Water works and sewers	6,000 00	
		$24,100 00
GENERAL EQUIPMENTS.		
Library, $2,000 a year	$4,000 00	
Museum, $1,000 a year	2,000 00	
Furniture, $500 a year	1,000 00	
		7,000 00
TOOLS, APPARATUS AND FITTINGS, IN SEVERAL DEPARTMENTS.		
Farm (silo, fencing, and tools)	$700 00	
Chemical (apparatus and minerals)	1,100 00	
Horticultural (tools, implements and cases)	1,000 00	
Botanical (apparatus and collection)	500 00	
Mathematical (surveying instruments)	500 00	
Industrial art and designing (furniture)	600 00	
Mechanical and engineering (models and tools)	400 00	
Printing (type, press, and cases)	1,000 00	
Physical and electrical (apparatus)	1,000 00	
Physiological and veterinary (models and charts)	250 00	
		7,050 00
Fuel and water supply, $3,500 a year		7,000 00
Salary of Loan Commissioner, $300 a year		600 00
Incidental expenses of loans, 1886-88		175 90
Total for two years		$45,925 90

FINANCIAL REPORTS, 1887-88.

REPORTS OF LAND AGENT.

To the Board of Regents—GENTLEMEN: I herewith submit my report as Land Agent for the fiscal year ending June 30, 1887.

LAND SOLD.

No.	*Purchaser.*	*Description.*	*Acres.*	*Price.*	*Cash.*	*Contracts.*	*Total.*
186	J. B. Blodgett	N.W.¼ 35, 5, 5	160.00	$9 00	$180 00	$1,260 00	$1,440 00
187	John Finley	N.E.¼ 2, 6, 5	153.02	9 00	172 35	1,206 45	1,378 80
188	G. M. Armstrong	N.½ N.W.¼ 27, 14, 2	80.00	14 00	140 00	980 00	1,120 00
	Totals.		393.02		$492 35	$3,446 45	$3,938 80

RECAPITULATION.

Number of acres sold	393.02
Amount sold for	$3,938 80
Received in cash	492 35
Received in contracts	3,446 45
Average price per acre	10 00

DEPOSITED WITH STATE TREASURER.

Contracts Nos. 186 to 188, inclusive	$3,446 45
Cash	492 35
Total	$3,938 80

CANCELED CONTRACTS.

The following contracts have been canceled for failure to meet payments, and surrendered to the Board of Regents:

No.	*Description.*	*Name.*	*Acres.*	*Amount.*
171	S.E.¼ 29, 15, 4	K. L. C. & E. Co	160.00	$1,330 00
179	N.E.¼ 2, 6, 5	Robert Wiley	153.02	1,206 45
146	N.½ N.W.¼ 27, 14, 2	Clara Hinman	80.00	980 00
	Totals		393.02	$3,516 45

LAND STATEMENT.

	Acres.
Unsold July 1, 1886, as per report	160.00
Received by cancellation of contracts	393.02
Total received	713.02
Sold as above	393.02
Balance unsold July 1, 1887	160.00

Respectfully submitted. **John B. Gifford**, *Land Agent.*
Manhattan, July 1, 1888.

To the Board of Regents—**Gentlemen**: Herewith is submitted my report as Land Agent for the fiscal year ending June 30, 1888:

No.	*Purchaser.*	*Description.*	*Acres.*	*Price.*	*Cash.*	*Contract.*	*Total.*
189	John L. Dunlap	S. E. ¼, 29, 15, 4	160	$9 50	$570 00	$950 00	$1,520 00

DEPOSITED WITH STATE TREASURER.

Contract No. 189	$950 00
Cash	570 00
Total	$1,520 00

LAND STATEMENT.

Unsold July 1, 1887, as reported	160 acres.
Sold as above	160 acres.

As the full amount of lands received from the grant, 82,313.53 acres, has now been sold, I hereby tender again my resignation of the office held by me since July 1st, 1883. Respectfully submitted.

Manhattan, July 1st, 1888. **John B. Gifford**. *Land Agent.*

REPORTS OF LOAN COMMISSIONER.

To the Board of Regents of the Kansas State Agricultural College—**Gentlemen**: I herewith respectfully submit my report of investments made for the endowment funds of the Kansas State Agricultural College, for the year ending June 30, 1887.

Invested in school-district bonds, 6 per cent	$56,082 00
" " " 5 per cent	1,000 00
" township " 6 per cent	12,000 00
" county " 6 per cent	20,000 00
Total	$89,082 00

Respectfully submitted. T. P. **Moore**, *Loan Commissioner.*
Manhattan, Kansas, June 30, 1887.

To the Board of Regents, Kansas State Agricultural College, Manhattan, Kas.—**Gentlemen**: I herewith respectfully submit my report of investments made for the endowment funds of the College, for the year commencing July 1, 1887, and ending June 30, 1888.

Invested in school bonds, 6 per cent	$10,250 00
" refunding " 6 per cent	14,880 00
" township " 6 per cent	10,000 00
Total	$35,130 00

Very respectfully, T. P. MOORE, *Loan Commissioner.*

TREASURER'S REPORTS.

To the Board of Regents — GENTLEMEN : Herewith find my report for the year ending June 30, 1887.

INTEREST ACCOUNT.

Received from State treasury	$33,653 50
" " Executive Department	175 52
" " Farm "	1,492 63
" " Horticultural "	374 40
" " Chemical "	174 00
" " Mechanical "	201 65
" " Printing "	642 35
" " Telegraph "	223 25
" " Domestic "	211 50
" " Sewing "	2 00
" " Refunded expenses, treasury	134 00
" " " " loan	23 68
" " Cattle-sale notes	473 20
Total	$37,781 68
Due Treasurer, July 1, 1886	$386 16
Paid approved vouchers, July 1, 1886, to July 1, 1887	42,285 21
Due Treasurer July 1, 1887	$4,889 69
Unpaid notes, receivable	175 00

APPROPRIATIONS, 1886-87.

MUSEUM FINISHING.	
Received from State Auditor	$3,000 00
Paid approved vouchers	3,000 00
CATTLE SHEDS AND CORN CRIBS.	
Received from State Auditor	$1,100 00
Paid approved vouchers	1,100 00
GENERAL REPAIRS.	
Received from State Auditor	$1,400 00
Paid approved vouchers	1,400 00
SALARY LOAN COMMISSIONER.	
Received from State Auditor	$300 00
Paid approved vouchers	300 00

Respectfully submitted. JOHN E. HESSIN, *Treasurer.*

MANHATTAN, KANSAS, July 1, 1887.

To the Board of Regents—GENTLEMEN: Herewith is submitted my report for the year ending June 30, 1888:

INTEREST ACCOUNT.

Received from State Treasury	$29,016 83
" " Executive Department	284 08
" " Farm "	1,389 12
" " Horticultural "	965 64
" " Chemical "	237 00
" " Mechanical "	4,472 48
" " Printing "	1,126 59
" " Telegraph "	273 11
" " Domestic "	177 45
" " Natural History "	225 00
" " Library "	12 12
" " Sewing "	7 30
" " Loan "	2 50
" " Refunding appropriation	3,828 79
" " R. B. Bryan	165 00
Total	$42,183 01
Due Treasurer, July 1, 1887	$4,889 69
Paid to State Treasurer, bonds	2,264 34
Paid approved vouchers, July 1, 1887 to July 1, 1888	44,937 89
Balance due Treasurer, July 1, 1888	$10,208 91
Unpaid notes receivable	475 00

APPROPRIATIONS, 1887-88.

ENLARGING CHAPEL, SEATING AND REPAIRS.

Received from State Auditor	$3,500 00
Paid approved vouchers	3,500 00

INSIDE BLINDS FOR COLLEGE.

Received from State Auditor	1,300 00
Paid approved vouchers	1,300 00

FURNISHING ATTIC.

Received from State Auditor	1,000 00
Paid approved vouchers	1,000 00

COAL CELLAR AND SCALES.

Received from State Auditor	700 00
Paid approved vouchers	700 00

GENERAL REPAIRS.

Received from State Auditor	1,000 00
Paid approved vouchers	1,000 00

LIBRARY.

Received from State Auditor	1,000 00
Paid approved vouchers	1,000 00

CASES, GENERAL MUSEUM.

Received from State Auditor	1,000 00
Paid approved vouchers	1,000 00

CASES, MINERALOGICAL CABINET.

Received from State Auditor	650 00
Paid approved vouchers	650 00

CASES, PHYSICAL APPARATUS.

Received from State Auditor	500 00
Paid approved vouchers	500 00

CASES, ENTOMOLOGICAL CABINET.

Received from State Auditor	350 00
Paid approved vouchers	350 00

EXPERIMENTS, FENCING, ETC., FARM DEPARTMENT.

Received from State Auditor	500 00
Paid approved vouchers	500 00

APPARATUS, CHEMICAL DEPARTMENT.

Received from State Auditor	500 00
Paid approved vouchers	500 00

APPARATUS, ZOÖLOGICAL DEPARTMENT.

Received from State Auditor	200 00
Paid approved vouchers	200 00

APPARATUS AND MACHINERY, MECHANICAL DEPARTMENT.

Received from State Auditor	500 00
Paid approved vouchers	500 00

APPROPRIATIONS, 1887-88—CONCLUDED.

APPARATUS, PHYSICS AND ENGINEERING DEPARTMENT.	
Received from State Auditor	500 00
Paid approved vouchers	500 00
SALARY, LOAN COMMISSIONER.	
Received from State Auditor	300 00
Paid approved vouchers	300 00
REFUNDING LOSSES.	
Received from State Auditor, see Interest Fund	3,828 79

Respectfully submitted. JOHN E. HESSIN, *Treasurer.*

MANHATTAN, KAS., June 30, 1888.

REPORT OF THE SECRETARY, 1886-88.

To the Board of Regents — GENTLEMEN: Herewith are presented, in concise tabular form, transcripts from the books of this office, showing the condition of the endowment fund at the close of each month, the sources of income each year, the summary of the annual inventory, and the expenditures and receipts of each College department for the years ending June 30, 1887, and June 30, 1888. There are also added, as required by law, explicit statements of the items of expenditure, under special appropriations, for the same year.

Vouchers for all expenditures, in duplicate, and duplicate receipts for all cash received, are filed in order and are accessible at all times.

Full ledger accounts of the invested funds, showing the exact condition in each investment of every kind, are kept from data furnished, through triplicate receipts, by the State treasury, after original entry of each bond purchased, as to both principal and coupons. Accounts are also kept with the State Treasurer and the College Treasurer, the several departments of the College, special appropriations, and the distinct funds in charge of the Board of Regents. All papers are filed, readily accessible to anyone inquiring into the financial condition of the College.

It is scarcely necessary to remind you that the books have been, as in previous years, in the immediate charge of Mr. I. D. Graham, Assistant Secretary, to whose diligence and ability general perfection of accounts is due. All general accounts have been carefully audited, as you are aware, by the Board of Regents at the regular quarterly meetings, and the final summary has been carefully tested by comparison of the reports of other officers, herewith presented.

Trusting that this report will be found in all respects correct and satisfactory, it is respectfully submitted for your consideration.

GEORGE T. FAIRCHILD, *Secretary.*

COLLEGE, MANHATTAN, KAS., NOV. 30, 1888.

SOURCES OF INCOME, 1886-87.

STATE TREASURY.	
Interest on school bonds, 10 per cent	$1,314 06
Interest on school bonds, 7 per cent	5,578 11
Interest on school bonds, 6 per cent	9,986 31
Interest on municipal bonds, 10 per cent	220 00
Interest on municipal bonds, 8 per cent	400 00
Interest on municipal bonds, 7 per cent	224 00
Interest on municipal bonds, 6 per cent	7,207 02
Interest on real-estate securities, 8 per cent	373 09
Interest on real-estate securities, 7 per cent	93 80
Interest on land contracts, 10 per cent	6,471 28
Interest on delinquent interest	385 37
Total	$32,253 04

SOURCES OF INCOME, 1886-1887—CONCLUDED.

COLLEGE DEPARTMENTS.

Rent of buildings	$38 00
Special fees from students	674 00
Sales of produce, stock, etc	2,633 65
From appropriations for labor and supplies	138 90
From cattle-sale notes	473 20
From refunded expenditures	170 43
Total	$4,128 18
From State treasury	32,253 04
Grand total	$36,381 22

SOURCES OF INCOME, 1887-88.

STATE TREASURY.

Interest on school bonds, 10 per cent	$1,309 26
Interest on school bonds, 7 per cent	5,254 77
Interest on school bonds, 6 per cent	10,590 15
Interest on school bonds, 5 per cent	54 15
Interest on municipal bonds, 10 per cent	150 00
Interest on municipal bonds, 8 per cent	400 00
Interest on municipal bonds, 7 per cent	224 00
Interest on municipal bonds, 6 per cent	9,832 00
Interest on real-estate securities, 8 per cent	180 00
Interest on land contracts, 10 per cent	3,508 97
Interest on delinquent interest	827 71
Total	$32,331 01

COLLEGE DEPARTMENTS.

Rent of buildings	$18 17
Special fees from students	692 85
Sales of produce, stock, etc	2,514 23
From appropriations for labor and supplies	3,373 95
From experiment station fund for labor and supplies	2,226 17
From refunded expenditures	47 02
From R. B. Bryan	165 00
Total	$9,037 39
From State treasury	32,331 01
Grand total	$41,368 40

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1886-87.

DEPARTMENTS.	EXPENDITURES.				RECEIPTS.			ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	State appropriations.	*Income fund.*	*Department transfers.*	*Inventory decrease.*	*Cash.*	*Department transfers.*	*Inventory increase.*		
Instruction		$21,864 73						$21,864 73	
Executive	$1,400 00	7,096 23	$3,877 67		$175 52	$103 52	$8,274 92	3,819 94	
Farm	1,100 00	3,355 02	417 90		1,492 63	108 07	1,705 10	1,567 12	
Horticultural		2,950 76	28 35		374 40	67 25	677 15	1,860 31	
Chemical		339 83	47 25	$36 90	174 00	6 85		243 13	
Natural History		209 47	82 05				420 25		$128 73
Mechanical		1,885 53	19 00		201 65	470 40	596 47	636 01	
Printing		1,981 48	14 07	146 85	642 35	919 95		580 10	
Telegraph		215 48	20 98	24 66	223 25			37 87	
Domestic		266 85	78 22		211 50	21 20	11 25	101 12	
Sewing		27 70	7 05	10 00	2 00	4 00		38 75	
Library		1,102 02	18 05				1,818 43		698 36
Physics and Mechanics		42 70	40 65				48 50	34 85	
Drawing		45 69	24 65	9 45				79 79	
Music		30 42	5 50					35 92	
Mathematics		12 85	30				13 00	15	
Military		6 94	11 20	12 30				30 44	
English and History			8 35					8 35	
Treasury		32 31		4,918 53	34,260 70				29,309 86
Land		11 60						11 60	
Loan	300 00	807 60			23 68			1,083 92	
Museum, finishing	3,000 00					3,000 00			
Totals	$5,800 00	$42,285 21	($4,701 24)	$5,158 69	$37,781 68	($4,701 24)	$13,565 07	$32,034 10	$30,136 95
State treasury, reported*				1,400 46				1,400 46	
Grand totals				54,644 36			51,346 75	$33,434 56	$30,136 95
Balance							3,297 61		3,297 61

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*This report charges the College with a warrant of $2,000, and fails to credit it with payments of interest in the $2,000 of $1,651.48. Had this been done, this statement would have shown a balance of $1,646.13.

CURRENT EXPENSE AND IMPROVEMENT FUNDS.

SECRETARY'S ACCOUNT OF RECEIPTS AND EXPENDITURES, 1887-88.

DEPARTMENTS.	EXPENDITURES.				RECEIPTS.			ACTUAL EXPENSE.	ACTUAL PROCEEDS.
	State appropriations.	*Income fund.*	*Department transfers.*	*Inventory decrease.*	*Cash.*	*Department transfers.*	*Inventory increase.*		
Instruction		$19,824 02	$132 00					$19,956 02	
Executive	$1,000 00	7,214 93	7,822 48		$284 08	$1,594 79	$7,005 12	7,153 42	
Farm	500 00	3,675 22	25 22	$222 10	1,389 12	328 60		2,704 82	
Horticultural	350 00	2,410 42	75 24		965 64	18 05	821 32	1,030 65	
Chemical	1,150 00	282 45	8 10		237 00	3 33	1,203 20		$2 98
Botanical	1,200 00	202 87	267 40	2,560 30	225 00	4,013 70			8 13
Mechanical	500 00	6,968 15	1,656 74		4,472 48	1,090 27	2,450 46	1,111 68	
Printing		1,821 96	115 59		1,126 59	648 44	92 97	69 55	
Telegraph		290 42	192 48	24 65	273 11	220 20		14 24	
Domestic		273 12	131 95		177 45		141 65	85 97	
Sewing		58 29	8 15		7 30		37 00	22 14	
Library	1,000 00	934 55	121 40		12 12	184 60	2,304 88		445 65
Physical	1,000 00	24 68	23 30			632 66	252 83	162 49	
Industrial Art		46 86	25 85				10 75	61 96	
Musical		22 50	9 54					32 04	
Mathematical			569 65				565 00	4 65	
Military		289 10	33 10				204 35	117 85	
English and History		7 30	2 75					10 05	
Treasury	3,828 79	515 90		4,815 38	33,010 62				23,850 55
Loan	300 00	72 65			2 50			370 15	
Veterinary		2 50	4,013 70				4,014 23	1 97	
Building improvement	6,500 00					6,500 00			
Totals	$17,328 79	$44,937 89	($15,234 64)	$7,622 43	$42,183 01	($15,234 64)	$19,103 76	$32,909 65	$24,307 31
In State treasury							3,328 89		3,328 89
Grand totals				69,889 11			64,615 66		$27,636 20
Balance							5,273 45		5,273 45

ENDOWMENT FUND—MONTHLY BALANCES, 1886-87.

MONTH.	SCHOOL BONDS.				MUNICIPAL BONDS.				LAND CONTRACTS.	REAL-ESTATE SECURITIES.		CASH.	ENDOWMENT.		
	10 per cent.	*7 per cent.*	*6 per cent.*	*5 per cent.*	*10 per cent.*	*8 per cent.*	*7 per cent.*	*6 per cent.*		*8 per cent.*	*7 per cent.*		*Total.*	*Productive.*	*Acres land.*
July	$13,652 28	$80,655 30	$180,694 68	....	$3,700	$5,000	$3,200	$123,900	$61,309 30	$4,716 67	$1,340 00	$21,195 75	$499,363 98	$478,168 23	160.00
August	12,871 06	80,355 30	186,534 68	....	3,700	5,000	3,200	123,900	54,207 87	4,716 67	1,340 00	21,461 95	497,287 53	475,825 58	393.02
September	12,871 06	80,355 30	197,734 68	....	3,700	5,000	3,200	123,900	54,369 96	4,616 67	1,340 00	11,578 66	498,666 33	487,087 67	240.00
October	12,871 06	80,355 30	206,864 68	....	3,700	5,000	3,200	123,900	50,869 21	4,616 67	1,340 00	5,949 41	498,666 33	492,716 92	240.00
November	12,802 28	80,198 03	210,346 68	....	3,700	5,000	3,200	123,900	44,205 21	4,616 67	1,340 00	10,477 46	499,786 33	489,448 87	160.00
December	12,727 28	79,702 73	209,836 68	....	3,700	5,000	3,200	123,900	42,821 21	4,616 67	1,340 00	12 941 76	499,786 33	486,844 57	160.00
January	11,318 94	79,307 73	208,096 68	....	3,700	5,000	3,200	123,400	41,848 86	4,616 67	1,340 00	17,957 45	499,786 33	481.828 88	160.00
February	10,910 00	78,860 50	208,076 68	....	3,700	5,000	3,200	123,400	40,970 86	4,616 67	1,340 00	19,711 62	499,786 33	480,074 71	160.00
March	10,910 00	78,860 50	208,876 68	....	3,700	5,000	3,200	123,400	38,322 81	2,750 00	1,340 00	23,426 34	499,786 33	476,359 99	160.00
April	10,910 00	79,360 50	208,876 68	....	3,700	5,000	3,200	125,400	36,728 21	2,550 00	1,340 00	22,720 94	499,786 33	477,065 39	160.00
May	9,880 00	78,740 14	209,776 68	....	3,700	5,000	3,200	145,400	34,713 21	2,550 00	1,340 00	5,486 30	499,786 33	494,300 03	160.00
June	9,280 00	76,690 14	208,075 00	$1,000	3,700	5,000	3,200	152,600	34,623 21	2,550 00	1,340 00	1,727 98	499,786 33	498,058 35	160.00

ENDOWMENT FUND—MONTHLY BALANCES, 1887-88.

MONTHS.	SCHOOL BONDS.				MUNICIPAL BONDS.				LAND CONTRACTS.	REAL-ESTATE SECURITIES.		CASH.	ENDOWMENT.		
	5 per cent.	*6 per cent.*	*7 per cent.*	*10 per cent.*	*6 per cent.*	*7 per cent.*	*8 per cent.*	*10 per cent.*		*8 per cent.*	*7 per cent.*		*Total.*	*Productive.*	*Acres land.*
July	$1,000 00	$204,359 99	$72,848 79	$7,530 00	$162,600	$3,200	$5,000	$3,700	$33,608 21	$2,550	$1,340	$2,049 34	$499,786 33	$497,736 99	160
August	1,000 00	204,167 99	72,699 06	7,530 00	162,600	3,200	5,000	3,700	32,065 73	2,550	1,340	3,933 55	499,786 33	495,852 78	160
September	1,000 00	203,667 99	72,699 06	7,530 00	162,600	3,200	5,000	3,700	29,549 13	2,550	1,340	6,950 15	499,786 33	492,836 18	160
October	1,000 00	204,735 99	72,699 06	7,530 00	162,600	3,200	5,000	3,700	28,354 13	2,560	1,340	7,077 15	499,786 33	492,709 18	160
November	1,000 00	204,735 99	72,573 32	7,530 00	162,600	3,200	5,000	3,700	26,874 13	2,550	1,340	8,682 89	499,786 33	491,103 44	160
December	1,000 00	203,225 99	72,073 32	7,530 00	174,600	3,200	5,000	3,700	26,203 63	2,550	1,340	*516 61	499,906 33	500,422 94	160
January	1,000 00	204,260 11	71,298 32	7,530 00	174,600	3,200	5,000	3,700	25,093 63	2,550	1,340	334 27	499,906 33	499,572 06	160
February	1,000 00	204,994 11	71,174 06	7,530 00	174,600	3,200	5,000	3,700	25,666 63	2,550	1,340	971 53	501,426 33	500,454 80	....
March	1,000 00	204,994 11	71,174 06	7,530 00	174,600	3,200	5,000	3,700	25,326 63	2,550	1,340	1,311 53	501,426 33	500,114 80	....
April	1,000 00	206,644 11	71,174 06	7,530 00	174,600	3,200	5,000	3,700	23,379 03	2,550	1,340	1,609 13	501,426 33	499,817 20	....
May	1,000 00	206,622 11	71,043 06	7,030 00	174,600	3,200	5,000	3,700	22,119 03	2,550	1,340	3,522 13	501,426 33	497,904 20	....
June	1,000 00	207,512 11	69,618 06	5,926 00	177,100	3,200	5,000	3,700	21,039 03	2,550	1,340	3,741 13	501,426 33	497,685 20	....

* Advance purchase.

DELINQUENT DISTRICTS.

Name of county.	*District...*	*Due in January..*	*Due in July....*
Barton	1		$120 00
Barton	5		40 00
Barton	84		12 25
Barton	82		16 62
Chautauqua	95	$11 37	11 38
Cherokee	61		15 00
Cherokee	83		21 00
Cherokee	18		33 24
Coffey	84		27 00
Comanche	43	14 46	14 46
Labette	43		28 00
Phillips	47		3 50
Phillips	93		12 25
Rooks — funding			95 00
Sedgwick	65		10 50
Totals		$25 83	$460 20

This amount, $486.03, is all that remains unpaid November 1, 1888.

SPECIAL APPROPRIATIONS.

ITEMIZED STATEMENT OF EXPENDITURES, 1886-7.

MUSEUM, FINISHING.	
Hulse & Moses, contract	$2,644 70
McCarthy & Sheahan, steam	294 40
C. A. Gundaker, mason	60 90
Total	$3,000 00
CATTLE SHEDS AND CORN CRIB.	
Hulse & Moses, contract	$1,073 57
L. Drury, teaming	3 00
C. D. Marvin, painting	50
Farm Department, grading	22 93
Total	$1,100 00
LOAN COMMISSIONER.	
T. P. Moore	$300 00
GENERAL REPAIRS.	
E. D. Hornbrook & Co., steam	$79 62
McCarthy & Sheahan, steam	271 56
A. M. Murray, labor	3 50
P. W. Zeigler, gas coupling	25
A. J. Whitford, hardware	59 00
E. B. Purcell Elevator Company, sundries	14 85
Manhattan B. L. & C. Co., lumber	199 15
S. L. Munson, sash and doors	76 50
W. H. Marvin, painting	169 15
C. D. Marvin, painting	52 50
R. Ulrich, brick	17 40
Exeter Machine Works, casting	5 00
Capital Iron Works, casting	68 00
J. M. Drown, plastering	18 67
Drown & Deibler, plastering	33 31
F. Samuels, plastering	43 50
C. A. Gundaker, masonry	6 90
S. Cooper, labor	6 00
R. B. Sarber, sand	1 50
S. M. Fox, wall-paper	4 20
Hulse & Moses, carpentry	95 30
Mechanical Department	112 80
Executive Department, labor	3 17
John E. Hessin, freight	58 17
Total	$1,400 00

SPECIAL APPROPRIATIONS—CONTINUED.

ITEMIZED STATEMENT OF EXPENDITURES, 1887-8.

LIBRARY.

C. W. Bennett	$42 20
E. A. Popenoe	17 90
John Gilmore	10 00
Jordon Bros	5 00
Houghton, Mifflin & Co	4 00
Estes & Lauriat	54 00
F. W. Putnam	4 05
D. O. Haynes & Co	2 00
A. L. Harnnel	2 00
Inland Architect	5 50
J. B. Lippincott & Co	4 00
Wm. A. Mowry	3 00
W. N. Farney	3 00
Magazine of American History	5 00
L. A. Foster	3 00
S. M. Fox	555 72
John Hessin, freight	15 00
Botanical Gazette	3 00
Wm. F. Clay	41 05
Library Bureau	2 00
Military Service Institution	4 00
A. S. Clarke	38 76
D. E. Lantz	2 00
American Art Printer	1 50
Subscription News Co	100 90
Polled Cattle Society	2 68
W. H. Kellerman	46 80
Joseph McDonough	6 87
S. C. Griggs & Co	2 67
E. R. Pelton	4 00
Popular Gardening Co	1 30
E. M. Shelton	3 60
N. D. C. Hodges	3 50
Total	$1,000 00

MUSEUM CASES.

Mechanical Department, labor, lumber, etc	$566 50
Campbell & Cutler, glass	433 50
Total	$1,000 00

ENTOMOLOGICAL CASES.

E. A. Popenoe, case	$137 82
Mechanical Department, cases	212 18
Total	$350 00

ZOÖLOGICAL APPARATUS.

Jas. W. Queen & Co	$139 95
Bauche & Lomb Optical Co	58 30
E. B. Purcell Mercantile Co	1 00
W. C. Johnston	75
Total	$200 00

BLINDS, COLLEGE HALL.

A. J. Whitford, hardware	$122 92
Topeka Sash and Door Co., blinds	980 45
Moore Bros. & Co., finishing	50 00
Mechanical Department, labor	146 63
Total	$1,300 00

MECHANICAL DEPARTMENT.

Capital Iron Works	$113 70
O. P. Hood	54 70
Deitz, Wouman & Co	264 60
Crane Bros. Manufacturing Co	63 52
Mechanical Department	3 48
Total	$500 00

LOAN COMMISSIONER.

T. P. Moore	$300 00

SPECIAL APPROPRIATIONS — CONTINUED.

ITEMIZED STATEMENT OF EXPENDITURES, 1887-8 — *Continued.*

FINISHING ATTIC, COLLEGE HALL.

Mechanical Department, labor and lumber	$741 98
R. B. Sarber, sand	2 25
R. T. McCamon ,sand	5 00
W. S. Baird, labor	2 50
Wm. Mohlman, labor	13 02
Farm Department, teaming	3 00
Campbell & Cutler, glass	9 30
Topeka Sash and Door Co., doors	59 50
Men's pay-roll, labor	56 28
Mesker & Bros., corrugated iron	107 17
Total	$1,000 00

CHAPEL ENLARGEMENT, ETC.

R. T. McCamon, excavation and sand	$117 08
Nationalist, advertising	2 00
Men's pay-roll, labor	1,567 49
S. I. Thackery, stone	135 60
M. B. L. & C. Co., lumber	343 52
A. J. Whitford, hardware	133 58
E. B. Purcell Mercantile Co., hardware	95 80
J. Harding, cut stone	90 00
I. W. Williston, cut stone	112 50
T. Kane & Co., seats	299 70
Farm Department, teaming	5 70
Vaughn & Brothers	36 00
Mechanical Department, shop work	31 03
Moore Brothers & Co., painting	550 00
Total	$3,500 00

FARM — FENCES, EXPERIMENTS, ETC.

M. B. L. & C. Co., lumber	$154 07
Farm Department, labor	42 10
J. T. Swingle, fencing	11 85
Mechanical Department, labor, lumber, etc	132 90
Newark Machine Co., implements	50 00
J. A. Everett	1 28
B. E. Turner	3 50
G. T. Fairchild, freight	1 25
Chemical Department, apparatus	3 00
Chicago Lumber Co., lumber	15 00
S. C. Sponberg, stonework	56 21
E. B. Purcell Mercantile Co., sundries	15 05
A. J. Whitford, hardware	4 14
R. Barnard, labor	9 65
Total	$500 00

COAL CELLAR AND SCALES.

R. T. McCammon, sand	$96 80
Men's pay-roll, labor	340 01
S. I. Thackery, stone	97 08
M. B. L. & Co., lumber	50 44
George E. Hopper, labor	53 27
E. B. Purcell Mercantile Co., hardware	28 50
I. Williston, cut stone	11 50
Jones Scales Co., scales	50 00
Total	$727 60

PHYSICAL APPARATUS.

E. B. Cowgill	$5 00
James W. Queen & Co	342 65
Brush Electric Co	48 75
John E. Hessin, freight	7 86
Midland Electric Co	9 70
Telegraph Department, labor	20 96
R. L. Cochran	42 66
Mechanical Department, labor	22 42
Total	$500 00

PHYSICAL CASES.

W. Marvin, finishing	$7 00
Mechanical Department, construction	493 00
Total	$500 00

SPECIAL APPROPRIATIONS — CONCLUDED.

ITEMIZED STATEMENT OF EXPENDITURES, 1887-8 — *Concluded.*

GENERAL REPAIRS.	
R. B. Sarber, sand	$1 50
W. H. Hope, painting	396 77
Green & Hessin, brick	11 85
A. J. Whitford, paints, hardware and tinning	244 84
Mechanical Department, labor and lumber	248 92
E. B. Purcell Mercantile Co	9 10
R. T. McCammon, sand	3 00
I. Williston, cut stone	9 00
R. Ulrich, brick	10 20
Topeka Sash & Door Co., doors and sash	56 85
E. M. Fox, wall paper	7 97
Total	$1,000 00
CHEMICAL APPARATUS.	
Emil Greiner	$213 56
P. W. Zeigler	5 94
Henry Heil	72 34
Richards & Co	36 66
John E. Hessin	1 35
Gilbert & Baker	2 00
Whitall, Tatum & Co	92 54
Elmer & Amend	53 97
A. J. Whitford	3 64
E. B. Purcell Mercantile Co	18 00
Total	$500 00
MINERAL CASES.	
Mechanical Department, materials and labor	$650 00

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1887.

EXECUTIVE DEPARTMENT.		
Farms and grounds	$38,200 00	
College buildings	109,425 00	
Furniture, tools, etc	4,573 57	
		$152,198 57
FARM DEPARTMENT.		
Buildings	$10,525 00	
Wells	180 00	
Work teams	450 00	
Crops on ground	379 00	
Cattle, 52 head	7,780 00	
Swine, 46 head	560 00	
Machinery	2,265 00	
Miscellaneous tools and implements	610 95	
Grain	180 00	
Interior fence	999 00	
Office furniture	304 00	
		24,233 85
NATURAL HISTORY DEPARTMENT.		
Apparatus, tools, etc	$294 80	
Models	82 00	
Museums	4,097 75	
Museum, Scientific Club	196 00	
		4,670 55
HORTICULTURAL DEPARTMENT.		
Orchards and plantations	$2,100 00	
Nursery stock	165 00	
Greenhouse	4,168 28	
Greenhouse tools	109 10	
Tools, general stock	876 10	
Furniture and apparatus	784 00	
Collections — woods and insects	635 00	
		8,837 48
CHEMICAL DEPARTMENT.		
Chemicals	$260 90	
Chemical apparatus	1,956 70	
Balances, weights and measures	390 00	
Photographic apparatus	34 65	
Platinum ware, wire, etc	101 45	
Mineral collections	1,054 00	
Cases and furniture	521 40	
Analytical tables with steam, gas, and water	1,285 55	
Miscellaneous	9 30	
		5,610 95

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1887 — CONCLUDED.

MECHANICAL DEPARTMENT.		
Tools, carpenter shop	$1,699 48	
Tools, blacksmith shop	319 45	
Lumber on hand	572 80	
Supplies	77 85	
Bills against appropriations	435 52	
Bills receivable	30 20	
Cash on hand	87 27	
		3,222 57
PHYSICS AND ENGINEERING DEPARTMENT.		
Engineering instruments	$590 00	
Physical apparatus	1,267 50	
		$1,857 50
MATHEMATICAL DEPARTMENT.		
Apparatus, charts, etc		21 25
PRINTING DEPARTMENT.		
Presses, type, cases, etc	$2,772 63	
Supplies	310 15	
		3,082 78
TELEGRAPH DEPARTMENT.		
Lines, batteries, tools, etc	$896 20	
Supplies, books, etc	53 99	
		950 19
INDUSTRIAL ART DEPARTMENT.		
Tables, models, patterns, tools, etc		821 57
DOMESTIC DEPARTMENT.		
Kitchen utensils	$342 55	
Dairy apparatus	89 85	
		432 40
SEWING DEPARTMENT.		
Machines	$175 00	
Furniture and apparatus	334 95	
		509 95
MUSIC DEPARTMENT.		
Pianos and organs	$1,128 27	
Furniture	23 80	
		1,152 07
LIBRARY DEPARTMENT.		
Books and pamphlets	$10,358 51	
Furniture and supplies	679 32	
Catalogue	1,179 63	
		12,217 46
MILITARY DEPARTMENT.		
Cases, tools, etc	$95 45	
Uniforms	471 85	
		567 30
ENGLISH AND HISTORY DEPARTMENT.		
Maps, charts, etc		26 50
TREASURY DEPARTMENT.		
Note — cattle sale	$135 00	
Order on School District No. 27, Stafford county	40 00	
		175 00
Grand total		$220,587 94

SUMMARY OF GENERAL COLLEGE INVENTORY, JUNE 30, 1888.

EXECUTIVE DEPARTMENT.		
Buildings	$116,625 00	
Grounds	38,200 00	
Furniture, tools, etc	4,378 69	
		$159,203 69
FARM DEPARTMENT.		
Buildings	$10,525 00	
Work horses.	225 00	
Cattle—Shorthorns	4,160 00	
Aberdeen-Augus	1,300 00	
Jersey	1,625 00	
Swine—Berkshire	345 00	
Poland-China	150 00	
Machinery	2,325 00	
Miscellaneous tools	569 75	
Miscellaneous articles	232 00	
Office furniture	306 00	
Crops on ground	628 00	
Fences, wells and bridge	1,621 00	
		24,011 75
HORTICULTURAL DEPARTMENT.		
Plantations	$2,215 00	
Greenhouse and stock	4,211 28	
Greenhouse and lawn tools	177 10	
Horses and horse tools	453 70	
Hand and garden tools	323 55	
Workshop tools	25 40	
Office furniture and apparatus	1,283 67	
Collections, insects and woods	735 00	
Supplies	234 10	
		9,658 80
CHEMICAL DEPARTMENT.		
Chemicals	$245 35	
Chemical apparatus	2,520 25	
Balances, weights and measures	390 00	
Photographic apparatus	34 00	
Platinum ware, wire, etc	104 50	
Mineralogical collection	1,054 00	
Cases and furniture	1,171 40	
Analytical tables with water, gas and steam	1,282 55	
Miscellaneous	12 10	
		6,814 15
MECHANICAL DEPARTMENT.		
Tools and machines, carpenter shop	$4,946 26	
Tools and machines, blacksmith shop	447 06	
Engineering apparatus	74 06	
Cash on hand	104 82	
Bills and accounts receivable	100 83	
		5,673 03
PRINTING DEPARTMENT.		
Presses, paper cutter and office fixtures	$1,756 55	
Type, furniture and stock	1,360 63	
Accounts receivable	58 57	
		3,175 75
TELEGRAPH DEPARTMENT.		
Batteries, lines, tools, etc	$902 45	
Supplies	23 09	
		925 54
DOMESTIC DEPARTMENT.		
Kitchen furniture	$373 75	
Dairy apparatus	200 30	
		574 05
SEWING DEPARTMENT.		
Machines	$210 00	
Cases and apparatus	336 95	
		546 95
LIBRARY DEPARTMENT.		
Books and pamphlets	$12,172 04	
Furniture, etc	530 91	
Typewriter, binders, frames, etc	156 51	
Card catalogue and supplies	1,662 88	
		14,522 34
BOTANICAL DEPARTMENT.		
Microscopes and accessories	$879 50	
Cases and shelves	211 60	
Furniture	84 00	
General herbarium and duplicates	508 60	
Kansas herbarium	264 40	
Supplies and apparatus	162 15	
		2,110 25

SUMMARY OF GENERAL COLLEGE INVENTORY—CONCLUDED.

PHYSICS DEPARTMENT.		
Electrical apparatus	$829 15	
Light apparatus	71 85	
Heat apparatus	80 38	
Sound apparatus	87 60	
General physical apparatus	424 05	
Meteorological apparatus	68 90	
Cases and shelving	506 75	
Lecture table and fixtures	31 65	
Note receivable	10 00	
		2,110 33
INDUSTRIAL ART DEPARTMENT.		
Tables, models and apparatus		832 32
MUSICAL DEPARTMENT.		
Instruments	$1,128 27	
Furniture	23 80	
		1,152 07
MATHEMATICAL DEPARTMENT.		
Mathematical instruments	$21 25	
Engineering apparatus	565 00	
		586 25
MILITARY DEPARTMENT.		
Cases, tools, etc	$90 10	
Uniforms	681 55	
		771 65
ENGLISH AND HISTORY DEPARTMENT.		
Maps, charts, etc		26 50
PHYSIOLOGY AND VETERINARY DEPARTMENT.		
General museum	$2,138 50	
Scientific Club donations	121 00	
Models, tools, etc	213 58	
Cases	1,541 15	
		4,014 23
TREASURY DEPARTMENT.		
Cattle-sale notes, $135 and $75	$210 00	
Order on School District No. 27, Stafford county.	40 00	
Chattel mortgage	225 00	
		475 00
Grand total		$237,184 64

ANNUAL REPORTS

OF

COLLEGE DEPARTMENTS.

1886-87.

REPORTS.

PRESIDENT'S REPORT, 1886–87.

To the Board of Regents—GENTLEMEN: A report of executive duties and general progress of the College, for the year ending June 30th, 1887, must refer to many matters finding fuller mention in the special reports of Departments accompanying. This shall be made as concise as possible, consistent with a reasonably complete record of important events and results.

The year has brought some changes in the Faculty of Instruction. Prof. O. E. Olin and Prof. E. B. Cowgill, after a year's trial, were permanently installed in the several chairs to which they were elected the previous year. Prof. B. F. Nihart, Librarian and Instructor in Book-keeping, resigned; and his classes in book-keeping were assigned to the care of Secretary Graham, while the Library was referred to a committee of the Faculty, with the same assistant as heretofore employed, Miss Carrie F. Donaldson. Prof. W. L. Hofer resigned the chair of music, and Prof. A. B. Brown, of Leavenworth, was called to the chair for a year's trial. Mr. T. T. Hawkes resigned his place of Superintendent of Shops, and the place was filled by appointment of Mr. O. P. Hood, a recent graduate of Rose Polytechnic School, Terra Haute, Indiana. In January, Mr. Geo. F. Thompson, Superintendent of Printing, resigned to enter business enterprise in publication of the Manhattan *Nationalist;* and Mr. J. S. C. Thompson, of Newton, was employed in his place. I am glad to report that the College has suffered no detriment in any of these changes. All of the gentlemen retiring have given excellent service for many years; but their successors have brought equal service, with somewhat increased efficiency of method. Assistance has been given by post-graduate and advanced students as follows: Miss Carrie Donaldson, Class of '84, assistant in the Library, has taught classes in telegraphy; Mr. F. J. Rogers, Class of '85, has given excellent assistance in various first-year classes; Miss Phœbe E. Haines, Class of '83, has also had special classes in arithmetic, English, and geography; Messrs. G. N. Thompson and S. N. Peck have acted as foremen in the Carpenter Shop; and Mr. D. W. Working has served for a part of the year in a similar capacity in the Printing Office; Mr. C. L. Marlatt, acting as assistant for a part of the year in the Department of Horticulture and Entomology, has taught classes for brief periods as needed.

The total attendance for the year reached 481, an increase of 53 over the previous year. The enrollment by classes is as follows:

	Gentlemen.	*Ladies.*	*Total.*
Post-graduates	5	5	10
Fourth year	20	4	24
Third year	33	11	44
Second year	57	43	100
First year	214	89	303
Total	329	152	481

These have represented sixty-six counties of Kansas, and fifteen other States. The average of ages is 19.41 years, as follows:

Post-graduates	24.01
Fourth-years	21.40
Third-years	20.52
Second-years	18.09
First-years	19.07

The usual provision for supplementary classes, to help along backward students too old for the common schools, has been made, young men over eighteen years of age, and young women over sixteen, being admitted though unable to pass the examinations required for full admission to College. They have added some four or five classes to the whole number during the year, but the extra expense has been slight, while the benefit to those 75 or 80 young people who might otherwise lose all opportunity for schooling is incalculable. It may be hoped that as the common schools are better, the need of such provision here will disappear.

The whole number of classes daily provided for, including industrials, military drill, and vocal music, is as follows:

Fall term, 57; winter term, 60; spring term, 56. This does not include special lessons in instrumental music, or sciences; or the special weekly exercises in rhetorical training. The classes of the first year have been too large for the best results, averaging over fifty in each division; but, on the whole, the progress has never been better.

The general routine of previous years has been followed. Chapel exercises at 8:30 A. M., led by Professors Lantz and Olin and myself in rotation, have been followed by five periods of fifty minutes each, called class-hours, during which all daily exercises in class-rooms, shops, and offices are held. Out-door industrials and blacksmithing occupy, on two days of each week, the hours from 1:30 to 4 P. M. Classes in vocal music also meet twice a week at 1:30 P. M. On each Friday afternoon at 1:30, the students have been required to attend a lecture or rhetorical exercises of fourth-year and third-year classes, occupying not to exceed one hour. The number of such exercises in chapel has been doubled, the alternating class rhetorical training of previous years having been assigned to the fifth hour on Wednesdays, for classes above the first year, and made a part of the ordinary English training of the first-year classes. The lectures of the year have been eighteen in number, as follows:

Sept. 17th, Prof. Kellerman, "Geologic Development of the Earth."
Oct. 1st, Prof. Cowgill, "Faraday and Modern Dynamo Electrical Machines."
Oct. 15th, Prof. Olin, "What are Trumps?"
Oct. 29th, Supt. G. F. Thompson, "Six Weeks on Wheels."
Nov. 12th, Mrs. Kedzie, "Dame Fashion and Her Freaks."
Nov. 26th, Pres. Fairchild, "Education: Who Needs It? Who Can Afford It?"
Dec. 10th, Supt. Hood, "The Evolution of the Hammer."
Jan. 14th, Prof. Brown, "The Vocal Instrument."
Jan. 28th, Hon. L. R. Elliott, "The Land of the Midnight Sun."
Feb. 11th, Prof. Shelton, "Ideals of Life."
Feb. 26th, Prof. Failyer, "History of Nitrogen and Its Compounds."
Mar. 11th, Capt. G. F. Price, "Life and Achievements of Gen. Geo. H. Thomas."
Mar. 25th, Secy. Graham, "Progress of Telegraphy."
April 8th, Prof. Lantz, "The Earthly Paradise."
April 22d, Prof. Popenoe, "Some Insect Parasites of Humanity."
May 6th, Prof. Walters, "The Future of Kansas."
May 20th, Secy. Graham, "A Great Idea in Education."
June 3d, Prof. Cowgill, "Progress in the New South."

Besides this regular course of lectures, there were three evening lectures provided by students and others interested. Dr. Alfred Russel Wallace gave a lecture on "Darwinism: What It is, and How Far It is Demonstrated," the expense being met by general subscription. Hon. Jno. A. Anderson gave an address, by invitation of the Alpha Beta Literary Society, upon "The Possibilities of Kansas." The annual address before the Webster Literary Society was given by Mr. J. W. Shartel, class of '84. All exercises in the chapel have been free of charge for admission.

The usual College social has been provided each term under the oversight of a committee of the Faculty; but, on account of numbers, invitation has been limited, outside students and officers, to parents of students and graduates of the College. This feature of College routine, with its amusing programme and social games, has proved an excellent part of general discipline in providing wholesome means of acquaintance and a lively entertainment.

Of the general discipline nothing need be said, but that all matters have come before the regular weekly Faculty meeting, and no serious penalty has been inflicted, except in the case of a thief, convicted of grand larceny and sentenced to the penitentiary. The order has been excellent and attendance regular.

While the general health has been good, a visitation of measles in April caused much anxiety and suffering. There were in all forty-two cases, two of which resulted fatally. Fifteen were thrown out of study for the remainder of the year, and the effect of absence was felt in many other instances through the term.

The usual satisfactory work has been done in the College literary societies, three of which have held their weekly meetings regularly. Two have given, under the oversight of a committee of the Faculty, public exhibitions of recognized merit. The Scientific Club, the Young Men's Christian Association and the Young Women's Christian Association have had the usual meetings.

The year closed with the usual exercises of Commencement week. The Baccalaureate Sermon was delivered by myself, as usual, from the feeling that this address gains its strongest influence from personal interest. The annual address was given by President Edwin Willets, of Michigan Agricultural College, upon "Personality and the Impersonal." The annual exhibition of the third-year class, under charge of Prof. Shelton, for the first time presented original pieces. All of the twenty-one graduates presented brief orations, prepared under direction of Prof. Olin, and received the degree of Bachelor of Science, conferred by action of the Board, upon recommendation of the Faculty. The following list presents their names in alphabetical order:

Names.	*Town.*	*County.*
Edgar A. Allen	Beloit	Mitchell.
Fred. H. Avery	Wakefield	Clay
Claude M. Breese	Elmdale	Chase.
John B. Brown	Guilford	Wilson.
Walter J. Burtis	Waterville	Marshall.
Mark A. Carleton	Scottsville	Mitchell.
Nellie E. Cottrell	Wabaunsee	Wabaunsee.
Bert. R. Elliott	Manhattan	Riley.
Frederic B. Elliott	Manhattan	Riley.
Clara M. Keyes	Manhattan	Riley.
Fred. G. Kimball	Manhattan	Riley.
Frederic A. Marlatt	Manhattan	Riley.
Wm. J. McLaughlin	Centralia	Nemaha.
Mary E. Moses	Manhattan	Riley.
Charles A. Murphy	Tabor	Clay.
Orlando G. Palmer	Jewell City	Jewell.
Louis B. Parker	Manhattan	Riley.
James E. Payne	Edgerton	Johnson.
Seward N. Peck	Junction City	Davis.
Geo. N. Thompson	Belmond	Iowa (State).
Willis M. Wright	Manhattan	Riley.

Five graduates of two or more years' standing, having pursued post-graduate studies, as required by the rules of the Board, received the degree of Master of Science. The following list presents their names, class in which they graduated, and the studies pursued for the second degree:

Bartholomew Buchli, class of '84, agriculture and zoölogy.
Henry M. Cottrell, class of '84, agriculture and chemistry.
Phœbe E. Haines, class of '83, botany and designing.
Charles L. Marlatt, class of '84, entomology and horticulture.
Frederick J. Rogers, class of '85, physics and engineering.

The indications are that the new plan, requiring for the second degree proficiency in both a science and an art, as laid down in the Catalogue, is well received by graduates, and that many will keep up their interest in further study through such definite leading. The five theses presented show actual investigation and research, and being upon uniform paper, will be bound for future reference in the College library.

Outside the College halls the work of the institution has been felt in various directions.

In July, 1886, the College exhibited at the meeting of the National Educational Association in Topeka, work of the several departments, especially drawings and shop work, but including scientific preparations by students. The College received high commendations for the direct usefulness implied, while the true idea of thorough scientific training was not lost.

The annual series of Farmers' Institutes, in two of which I had personal interest by attendance, was held as follows:

Blue Rapids, Marshall county, December 9th and 10th.
Wakefield, Clay county, December 16th and 17th.
Osborne, Osborne county, December 21st and 22d.
Stockton, Rooks county, February 4th and 5th.
Blue Mound, Linn county, February 10th and 11th.
Eskridge, Wabaunsee county, February 24th and 25th.
Independence, Montgomery county, February 24th and 25th.

My duties at the College have been unchanged, except as the increased number of students and the extension of buildings and apparatus have given additional cares. I have taught the Fourth-year class in psychology and ethics, logic, and political economy, having an average roll of twenty-four members. About one-half of this instruction has been by daily lectures, with occasional written recitations and examinations. At the request of the Faculty, on the resignation of Prof. Shelton of the place of managing editor of the *Industrialist*, I undertook those duties, and have carried them with pleasure throughout the year. The Faculty have all contributed willingly. To Prof. Shelton, Prof. Walters, and Secretary Graham special credit is due for items and clippings of interest. The general oversight of accounts has been slight, with the efficient services of Secretary Graham at the books; but I have still responsibility for every expenditure so far as to understand its necessity before affixing my signature to the vouchers. The expenditures directly under my charge, in the Executive Department, including buildings, have amounted to over $12,000, a detailed statement of which is presented herewith. An extensive correspondence upon all College matters I have kept up with my own hand, though mere applications for information as to course of study have been turned over to the Secretary of the Faculty.

In matters of outside interest to the College, my duties have called for considerable outlay of time and strength. The State Board of Education, the State Teachers' Association, and the National Educational Association have required my attendance, with some preparation. I gave addresses before County Normal Institutes in Doniphan and Wyandotte counties, and visited, by order of the State Board of Education, the Institute at Concordia. It fell to my lot, also, to watch the interests of the College in the State Legislature, though but one day was spent in attendance, at the request of the Committee of Ways and Means in the House. All invitations to give lectures and addresses during term-time I have felt compelled to decline from the nature of duties at College. I found time in vacation for a visit to a similar institution at Ames, Iowa, where friends made my stay both pleasant and profitable.

In closing I wish to express gratitude to my associates in the Faculty, with whom all responsibilities are shared, and to the members of the Board, who have so courteously and energetically supported the work.

I append a statement of expenditures and receipts, so classified as to show the kind of expenses required. The total inventory of property under my personal charge, without the responsibility of other members of the Faculty, is $152,198.57.

EXPENDITURES.		
Offices:		
Postage, all departments	$257 30	
Stationery	57 15	
Labor, clerical	191 20	
		$505 65
Care of buildings, heating, etc.:		
Janitor's wages	$900 00	
Students' wages	647 88	
Fuel	2,925 49	
Lights, oil and gasoline	107 46	
Tools, etc	47 95	
		4,628 78
Buildings:		
Repairs	$757 70	
Improvements	4,454 52	
		5,212 22
Grounds:		
Care	$7 75	
Improvements	242 90	
		250 65
College Class-rooms, etc.:		
Furniture	$127 54	
Incidentals	197 88	
		325 42
Sundries:		
Advertising and *Industrialist*	$505 00	
Farmers' Institutes	262 62	
Catalogue	196 00	
Exhibition N. E. A.	114 51	
Flag and staff	101 05	
Commencement	88 35	
Rhetorical selections (book)	94 00	
Expenses of board meetings	66 00	
Expenses of State Board of Education	23 65	
		1,451 18
Total		$12,373 90
RECEIPTS.		
Cash:		
Rent	$38 00	
Sales of coal	112 18	
Sundries	25 34	
		$175 52
Department transfers		103 52
Increase in inventory		8,274 92
Total		$8,553 96

The difference, $3,819.94, represents the actual expense of the department over all enlargements and improvements.

Respectfully submitted. GEO. T. FAIRCHILD,
COLLEGE, June 30, 1887. *President.*

FARM DEPARTMENT.

To the Board of Regents—GENTLEMEN: Below is given in outline the work done in the Farm Department for the year ending June 30, 1887.

I have taught classes during the year as follows: In the fall term a class in agriculture, consisting of twenty-two young men, mostly of the fourth-year, and a class of thirty-eight students of the third-year, in farming taken as an "industrial;" a class in stock-breeding and agriculture in the winter term, made up of second-year students, forty-nine in all; in the spring term a class of twenty-four members of the fourth-year class in U. S. constitution, and a class in farming numbering thirty-eight young men, for the most part of the second-year. Throughout the entire year I have had charge of the third-year class, numbering forty-one, in rhetoricals.

My instruction in agriculture and stock-breeding has generally been given in lectures, although Miles's work on stock-breeding has been used to some extent. The aim has been to give to the students of agriculture as thorough an acquaintance with agricultural principles and practice as the time at my disposal would permit. In stock-breeding, familiarity with the history and characteristics of all of the better known breeds of cattle has been insisted on in the case of every student, and a careful study is made of the local circumstances affecting the development of breeds, as well as the practices of the most eminent breeders. The chief difficulty experienced in endeavoring to carry out my plans has grown out of the shortness of the time allotted to the work. With the passage of the years a subject kept constantly in mind naturally grows upon one, so that what in the outset seemed ample time has, in the course of time, became quite insufficient for a full treatment of the theme.

The industrial farm work has been carried out with some modifications upon the plan of previous years. While the work of each day has been planned with a view to the educational needs of the student, yet only in occasional instances has it been found necessary to make the farm industrial mere trial, or laboratory, work. It has been the constant object to give to that work, not merely the air, but the reality, of practical business farming. The work in every case has been done as nearly as possible as such work is done by the best farmers, upon the best-managed farms. Our students have done a very large part of the work involved in the care of the College farm of some 315 acres, including the feeding and management of a herd of fifty head of pure-bred cattle and forty head of swine. The use of the machinery for grinding, threshing, and cutting fodder, has been freely given to the student. In addition to this work, which may be called largely educational, the class has husked 550 bushels of corn, erected 120 rods of wire fence, and twenty rods of board-and-wire fence, and hauled 220 loads of manure afield, to say nothing of such less-conspicuous work as grading, repairing fences and buildings, plowing, planting, and seeding. In this way and in others the constant effort has been to make the farm a part of the educational machinery of the College. My only regret in all this is, that much more time cannot now be given to this farm industrial. It seems to me to be very desirable, that instead of working each class as is now done, in divisions, alternately, by half-terms in the Horticultural and Farm departments, that each class should spend the whole term upon the farm, assigning work in the Horticultural Department at another term.

The third-year class in rhetoricals, as in years previous, has been in my charge throughout the entire year. Regular weekly class-meetings have been held, at which essays and declamations have been presented for discussion and criticism. In addition, each student of the class has delivered one declamation, and two original orations publicly in chapel. To a division of this class the work of the undergraduates' exhibition of Commencement was assigned by the Faculty.

During the year I have taken part in four Farmers' Institutes, held at Blue Rapids, Stockton, Winfield and Independence respectively, and in addition, have by invitation, given addresses before a number of other farmers' organizations.

THE FARM.

The season of 1886, in an agricultural view, has been characterized by generally very light crops, caused by drouth, chinch-bugs and severe winter freezing. Our winter wheat was totally destroyed by "winter-killing" during the winter of 1885–86, and the same fate has overtaken the crop sown in the fall of 1886. In consequence of the protracted drouth of July and August our yield of corn, even upon the best lands, was less than a half crop. Our crop of corn and sorghum fodder was greatly shortened from the same cause. On the other hand, the yield of oats — of the Red Winter variety — was very good indeed, averaging fifty-five bushels per acre over the fifteen acres thus cultivated. A very promising crop of millet hay, twelve acres in extent, was almost totally ruined by the chinch-bugs. This is the first considerable damage from the action of these pests that I have had to report.

The season has proved disastrous to well-nigh every interest upon the farm. This fact, taken in connection with the prevailing low prices, is a sufficient explanation of the balance that appears against the farm.

The hay crop has been very light, and in consequence our chief reliance for provender has been corn fodder. Every year's experience confirms me in the view which has been urged in previous reports: that corn planted thickly in drills, and shocked when the ears of corn, of which it will bear a considerable crop, have fairly passed the milk stage, is, in Kansas, the best and cheapest fodder within reach of the farmer.

During the first week in September eighteen tons of sorghum were cut into inch lengths and packed away in the silo for use in the condition of "ensilage." Late in January the silo was opened, and the great mass of its contents found to be in good condition. The ensilage seemed to be relished by the stock, with few exceptions, and its consumption was attended with but little waste. Of course, no satisfactory conclusion can be drawn from a single, very limited trial, such as we were able to give ensilage last year. This fact, however, was very apparent from the first: that capital required for machinery, men, and teams, in making ensilage, puts the system quite out of the reach of farmers in general.

BUILDINGS.—The cattle-shed and experimental piggery, referred to in my last report, have been completed, externally and internally, except in the case of the piggery, which yet lacks interior partitions. In addition, a new corn-crib, having a capacity of over 2,000 bushels of corn, has been finished throughout. This corn-house has two parallel cribs, separated by a ten-foot alley, and is provided with an elevated driveway on its west side, from which grain may be unloaded easily and directly into the highest part of either crib.

FENCES.—About 120 rods of barbed-wire fence, and thirty rods of board-and-wire fence, have been placed upon the new purchase north of the barn, thus completely inclosing this portion of the farm, and placing it in suitable fields. A lane fence, giving easy access to every field of this newer portion of the farm, is planned, and I have the authority of the Board for completing the work at an early day.

STOCK.—I have not many recent changes to note in the condition of the herd. The demand for stock has been much less brisk than in previous years, and prices have generally ruled low. Nevertheless, we have succeeded in disposing of most of our surplus breeding-stock at living prices. Some additions have been made to the herd by exchange and purchase. An exchange was effected with Judge J. R. Goodwin in February, by which the College came into possession of the handsome four-year-old Aberdeen-Angus bull, "Heir of the Shire." We gave in exchange a yearling of our own breeding. While visiting at the Illinois State University, last year, I purchased of that institution, for the College, two Jersey heifers of superior breeding and individual excellence. Some further additions must be made at an early day if the character and reputation of the herd is maintained. Particularly we need a first-class Shorthorn bull for use the coming season. Our Poland-China stock also needs an infusion of new blood. I ask, therefore, that authority be given me to purchase one boar and one or two young sows of this breed.

MACHINERY.—A number of machines and implements, some of considerable value, have been added to the equipment of the farm within a year, by donation and purchase. The following are the donations generously made by the several manufacturers named to the department during the year: One No. 3 Duplex grinding mill (old style) and one improved No. 3 Duplex mill, both made by the Duplex Manufacturing Company of Springfield, Ohio; one Ross fodder-cutter ("No. 13 A"), manufactured by E. W. Ross & Co., of Springfield, Ohio; one Quaker City double grinding mill, manufactured by A. W. Straub & Co., Philadelphia, Penn.; one jointer, for use with sod plow, manufactured by the South Bend Iron Works Company, South Bend, Indiana.

The machinery purchased by the department is given below. In the case of every purchase, however, a considerable reduction — in some cases amounting to fully one-half from the regular prices — was allowed: One Johnson manure spreader, manufactured by the Newark Manufacturing Company, Columbus, Ohio; one fourteen-inch Canton turf plow and one two-horse walking cultivator, both manufactured by the Parlin & Orendorf Company, Canton, Illinois. The above, with a few small tools — spades, shovels and scythes — complete the list of new appliances added during the year covered by this report.

FINANCIAL STATEMENT.

To valuation, June 30, 1886	$22,528 75	
Vouchers approved and Department bills	4,872 92	
By valuation, June 30, 1887		$24,233 85
Amount received for stock, produce and labor		1,600 70
Amount expended in experiments, not inventoried		539 61
Balance		1,027 51
Totals	$27,401 67	$27,401 67

Respectfully submitted. E. M. SHELTON,
COLLEGE, June 30, 1887. *Professor of Agriculture.*

CHEMICAL DEPARTMENT, 1886–7.

To the Board of Regents — GENTLEMEN: There were, in my department, during the year ending June 30, 1887, classes as follows:

Fall term — Two classes daily in inorganic chemistry; a class three times per week in chemical manipulation; a class, weekly, in Second-year rhetorical work; one special student.

Winter term — A class in agricultural chemistry; two classes one-half term in organic chemistry; two classes one-half term in mineralogy; two classes one-half term in determinative mineralogy; one class each week in Second-year rhetoricals; one special student.

Spring term — Three hours daily in chemical analysis; a class, weekly, in Second-year rhetorical work; one special student.

Since March 1, 1886, the rainfall has been collected in a rain-guage of one-thousandth of an acre in area, situated on the College grounds. The rain-water collected in this gauge has been analyzed for nitrogen compounds. The results will be published when a longer time shall have rendered them of more value. It is not considered necessary to publish them each year.

As heretofore, Mr. Willard has performed an important part of the work of the Department. After four years of faithful and efficient labor, he severs his connection with the Department to enjoy the greater opportunities for advancement in his chosen work afforded by Johns Hopkins University.

The improvements made during the past year, and those now in progress, add greatly to the comfort, convenience and appearance of the Laboratory building.

FINANCIAL STATEMENT.

DEBITS.		
Inventory, June 30, 1886	$5,647 85	
Chemical apparatus	205 41	
Chemicals	69 72	
Freight, expressage and drayage	39 31	
Student labor	28 50	
Gasoline	24 60	
Miscellaneous	50	
Stamps	3 40	
Department bills, (not included above,)	15 65	
CREDITS.		
Inventory, June 30, 1887		$5,610 95
Students' fees (paid to Secretary)		174 00
Department bills		6 85
Balance		243 14
Totals	$6,034 93	$6,034 93

Respectfully submitted. G. H. FAILYER,
COLLEGE, June 30, 1887. *Professor of Chemistry and Mineralogy.*

DEPARTMENT OF HORTICULTURE AND ENTOMOLOGY, 1886-87.

To the Board of Regents—GENTLEMEN: I have the honor to submit herewith a report of the work done in the Department of Horticulture and Entomology during the year ending June 30, 1887.

CLASSES.

The classes in my charge during the several terms of the year are named, and the enrollment in each class shown, in the following table:

Studies.	*Males.*	*Females.*	*Total.*
FALL TERM.			
Horticulture	48	31	79
Special Entomology	2		2
Horticulture, Industrial, third year	27		27
Greenhouse, Industrial		1	1
Rhetorical work, second year	15	14	29
WINTER TERM.			
Special Entomology	1		1
Horticulture, Industrial (greenhouse)		1	1
Rhetorical work, second year	14	11	25
United States History	63	33	96
SPRING TERM.			
Entomology	31	22	53
Horticulture, Industrial, second year	29		29
Greenhouse, Industrial		2	2
Rhetorical work, second year	12	8	20
Post-graduate study in Horticulture and Entomology	1		1
Totals	243	123	366

The instruction and methods have been substantially as detailed in the Catalogue and in previous reports, with such modification as experience or circumstance demanded.

THE GROUNDS.

On the grounds, there has been given the care needed to maintain the general appearance of the lawn, to keep the drives in repair, and to meet similar regular demands. Special tasks of the past year have been the regrading, seeding and sodding of portions of the lawn; the top-dressing of portions near the buildings; the construction of a permanent walk of coal-cinders, extending from the shops to the armory, and having a width of six feet; and the development of the plan of the grounds, as adopted two years ago, by the following plantings: the west half of the south line of the grounds, the two large groups on the crest of the hill south of the College building; a large area in the center of the fields south of the present main approach; and numerous additions, of a permanent nature, to the shelter belts and groups already established.

Twenty-five sorts of ornamental trees, hitherto untested, were added to the list of sorts on trial. In all, two thousand and fifty trees were added to the plantations and nursery for final use on the lawn. One thousand of these were small red cedars, a large proportion of which perished in the fortnight's dry weather that followed their planting. The remainder of the stock is at this date in good condition.

ORCHARDS AND GARDENS.

In the orchard, the removal of the alternate trees has been nearly completed, and as they now stand the trees will have room for many years' growth. Vacancies occur in the rows of Winesap trees, from a cause unknown, but thought to be the effect of the late, dry summers and severe winters upon trees weakened by overbearing. Twig-blight has injured some trees, especially those of the Wagener and Talman varieties. With these exceptions, the orchard is in better condition than before. The bearing trees throughout were sprayed in the Spring with London purple, and were afterward banded, to test again the value of this treatment in reducing the number of codlin-moth larvæ, and of wormy apples. The result confirmed the conclusions drawn from our previous tests in the same line, as already given in the *Industrialist* and elsewhere, that over seventy-five per cent. of the crop is thus saved from this insect.

Two hundred trees, one to five years old, and mostly from our own nursery, were added to the various orchards. Trees of sorts not then represented in our collections were purchased as follows: Apples, one; pears, two; plums, three; and quinces, five sorts. To the lists of small fruits were added sorts not on our lists as follows: Raspberries, eight; blackberries, three; dewberry, one; gooseberries, two; currants, one; and strawberries, thirteen sorts. In the vineyard, the old Concord vines standing in the belt of gravel running through the plot, being dead or injured beyond recovery by drouth and winter and poor soil, were replaced by young vines of many sorts, chiefly of our own growing. Vines of eleven sorts not on our lists were purchased. In all 250 vines were thus replaced. This half of the vineyard was then thoroughly dressed with well-rotted stable manure. In addition to the accessions made by purchase, our trial lists have been enlarged by gifts from Mr. E. Y. Teas, Dunreith, Indiana, trees and shrubs of 22 sorts of ornamentals, 13 of which are new to our lists; from Mr. A. H. Griesa, Lawrence, Kansas, trees of named varieties of Russian apricots, and of a Japan peach; from the Huntsville (Ala.) Nurseries, by Mr. W. F. Heikes, ten trees of five varieties of pears, worked on LeConte stocks; from Mr. E. Eicholtz, Detroit, Kansas, trees of two sorts of evergreens not on our list; and from Mr. J. J. Measer, Hutchinson, Kansas, grafts of two choice seedling varieties of the Russian mulberry.

THE GREENHOUSE.

The expense of the greenhouse has been limited to the cost of care and heating. No purchases were made during the past year, except for current needs, the few accessions to the stock being made by exchange. The growth of our specimen plants to large size calls attention to the need in the near future of additional rooms of greater height and more convenient arrangement for the reception of the taller-growing sorts.

IN THE OFFICE

I have had the assistance of Mr. C. L. Marlatt for several months of the spring and summer. His time has been given entirely to entomology, his work being principally the collection and preparation of specimens for the museum, the rearing of injurious and other insects, in order to learn their development; the preparation of drawings and descriptions to illustrate the various stages, and the care of the experimental work in economic entomology; in all of which the work has been done in a satisfactory manner.

I may here acknowledge the gift, by the "Hemingway's London Purple Company," New York, of a cask of London purple for use in experimental entomology; and to the entomological museum, by Mr. G. V. Johnson, Centerville, Idaho, of two lots of insects from his locality.

My work on the *Industrialist*, in the Farmers' Institute, in the Academy of Science, and elsewhere, has been substantially as detailed in previous reports, and need not be given here.

Herewith please find a statement of the finances of the department for the year past.

FINANCIAL STATEMENT.

Total cash expenditures for the year, $2,950.76. Distributed approximately as found on next page.

EXPENDITURES.		
Grounds	$1,229 51	
Orchards and gardens	623 86	
Greenhouse	355 80	
Tools and repairs	101 30	
Museum and instruction	166 70	
Office assistance and supplies	273 51	
Current supplies	200 08	
		$2,950 76
Bills from other departments		28 35
Total expenditure		$2,979 11
RECEIPTS.		
Total cash receipts		$374 40
Credits by department transfers		67 25
Increase in inventory		677 15
Total credits		$1,118 80

The balance of $1,860.31 represents the outgoes in care and improvement of grounds not inventoried, and actual expenses of maintaining the department. Respectfully submitted. E. A. POPENOE,

Professor of Horticulture and Entomology, Supt. of Orchards, Grounds, and Gardens.

COLLEGE, June 30, 1887.

DEPARTMENT OF BOTANY AND ZOÖLOGY, 1886-87.

To the Board of Regents—GENTLEMEN: Early in the year, this Department was moved into new quarters, provided for it in the building heretofore called the armory, now known as the museum building. The whole upper story is occupied, the space being divided as follows: The west room, forty-two feet square,—with gallery around the whole room, reached by two flights of stairs near the main entrance door from the hall,—is for the collections of the general museum. The recitation room, 21x30 feet, is in the east end of the building, with windows to the east and south. Immediately north of the recitation room is a small laboratory, 12x21 feet, having windows to the east and north. Between this room and the museum room, on the north side of the hall, is another laboratory, 17x30 feet. A wide door connects the two laboratories, so that they can conveniently be, and are generally, used as one continuous room. South of the hall are two small rooms—a private laboratory, 15x17 feet, with a door opening directly into the museum room, and an office, 10x17 feet, adjacent to, and connected by a door with the recitation room; a door from the central hall (which is reached by a flight of stairs directly from the south entrance to the building) also leads into each of these two rooms. Over them is a capacious store-room, with stairway directly over the stairway mentioned above. Two trap-doors through the two floors permit large objects, boxes, etc., to be taken by rope and pulley from the entrance-hall on the first floor to the store-room. A door from this room opens directly into the gallery of the museum room.

Cases have been planned for the laboratories and for the museum room;

but one in the north laboratory only has yet been built. Temporary shelf-tables have been made the entire length of the laboratories on the north and east sides. These, with tables previously owned by the department, afford ample space for the prosecution of laboratory work. The recitation room is very well lighted, and, though small, contains seats for over forty students. The enlargement of the windows in the north laboratories promises to afford sufficient light for satisfactory work there. A tank placed in the store-room affords water for use in the laboratories.

The special wants, aside from those provided for in plans already adopted, are a book-case and a writing-table for the office, and larger and improved "shelf-tables," with drawers, for the two larger laboratories.

The most important additions to the museum for the year are a skeleton of a Shorthorn cow, mounted by Henry Ward of Rochester, and a collection of several thousand shells purchased of W. W. Calkins. Mr. Calkins also donated many botanical specimens. The other donations, noticed from time to time in the *Industrialist*, are too numerous to recapitulate here. A fuller account of the museum will be given as soon as the specimens can be placed on exhibition.

The class work for the entire year is shown in the following tabulation, the students in elementary botany reciting in four sections, one in the fall and three in the spring term:

Elementary Botany	138
Structural Botany	22
Special Botany	1
General Zoölogy	12
Special Zoölogy	2
Geology	18
Physiology	41
Industrials	3

The expenditures of the department for the year were as follows:

Apparatus	$41 70
Specimens for museum	126 25
Class supplies	4 72
Labor by students	18 45
Freight and expressage	18 35
Department bills—Mechanical	65 35
Printing	13 40
Executive	1 30
Sewing	2 00
Total	$291 52

The general inventory shows an increase of $420.25 in the value of apparatus and specimens.

Respectfully submitted. W. A. KELLERMAN,

COLLEGE, June 30, 1887. *Professor of Botany and Zoölogy.*

DEPARTMENT OF MATHEMATICS, 1886–87.

To the Board of Regents—GENTLEMEN: The following is a statement of classes under my instruction during the College year ending June 30, 1887:

TERMS.	*Number enrolled.*
Fall Term.	
Algebra (two divisions)	78
Arithmetic (two divisions)	98
Winter Term.	
Geometry (two divisions)	70
Algebra	34
Arithmetic	49
Spring Term.	
Geometry (two divisions, half-term each)	52
Algebra (two divisions)	114

The work done by these various classes was similar to that reported in previous years. A constant improvement is noticed, from year to year, in the ability of our first-year classes. With this increase of preparation on the part of those seeking admission to the College, it is expected that we shall be able to shorten the time given to the review of arithmetic, and thus secure more time for the study of algebra.

The greatest defect noticed in the preparation of students seeking admission to our classes in mathematics is the lack of training in the analysis of arithmetical processes. There is too much dependence upon rules and formulas, and not enough ability to reason about numbers in their application to real transactions. In my estimation, the great mathematical want of our Kansas schools is training in analysis

My appointment by the Faculty at the beginning of the year, as Chairman of the Committee on Library, has required the employment of most of my time outside of class hours in the discharge of the various duties connected with the office of Librarian.

Respectfully submitted.
D. E. LANTZ,
Professor of Mathematics.
COLLEGE, June 30, 1887.

LIBRARY.

To the Board of Regents—GENTLEMEN: I have the honor to submit the Librarian's report for the college year ending June 30, 1887.

My work in this department began with my appointment by the Faculty as Chairman of the Committee on Library, in September, 1886. I found the Library in good condition, and the work of cataloguing books almost complete to that date. The work was carried forward during term-time, mostly by the Assistant, Miss Donaldson, the Committee assuming only general direction of affairs.

The use of the library by students has increased considerably during the year. The following statement of the character of the books drawn during the year will be of interest, as it affords opportunity for comparisons with the use of other libraries:

Agriculture	162	Biography	373
Horticulture	79	Travels	228
Botany	50	Education	50
Zoölogy	64	Political Economy	131
Chemistry	42	Law	20
Physics	53	Mental Philosophy	30
Mechanics	86	Religious	50
Physiology	107	Government Reports	22
Geology	14	Household	58
Military Science	15	Orations	56
General Science	354	Essays	471
Total scientific	1,085	Poetry	251
Bound magazines	751	Literary topics	252
Fiction	1,169	Juveniles	147
Art	51	Unclassified	166
History	632	Grand total	5,994

A careful inventory of the books on hand June 30, 1887, gives the following result:

6,572 bound volumes, valued at	$10,211 76
2,350 unbound pamphlets, valued at	45 00
360 bound volumes, duplicates, valued at	101 75
Total value of books	$10,358 51

An increase over the inventory of 1886 of $1,575.77. This unusual increase in the value of the library is due to two facts: *First*, many of the worn-out cloth bindings have been replaced by substantial leather bindings, under provision of law, at the expense of the State; *second*, many of the books, especially reports upon scientific subjects, become more valuable as they go out of print and become rare. Our aim in making the present inventory was, in the absence of any of the original bills, to appraise each book as nearly as possible at the price for which it could be replaced in the library. The increase in value of books due to these causes is $696.16. The remainder represents purchases and donations. Books valued originally at $15.50 have been withdrawn from circulation because they were worn out, and are not included in the inventory.

The appropriation of $500 made by the Board at the beginning of the year was all expended in the purchase of books, which were catalogued and placed upon the shelves during the summer vacation, the work being done under the management of the former Librarian, Prof. Nihart. Valuable additions to the library were also made by binding the periodicals received during the previous year. The additions of bound volumes to the library during the year were as follows: By purchase, 274 volumes; by binding, 131 volumes; by exchange, 3 volumes; by donation, 58 volumes; total, 466 volumes. A complete list of these donations has not been accessible, but the principal ones are shown in the exhibit accompanying this report. A periodical list, to the amount of about $155 at wholesale rates, was presented for purchase at the beginning of 1887, but owing to a lack of funds, an order amounting to only $88.85 was made, leaving the balance to be ordered from funds available July 1, 1887. In consequence of this, the reading-table was without a number of the most important magazines during the last six months of the financial year.

The most serious need of the library, at present, is more room. Even now, all the shelf-room in some of the departments is occupied; and transferring the books to other alcoves breaks up the classification in a most objectionable manner. Besides, the upper shelves are so far from the floor, that to put books which are in daily use upon them is to make them accessible only to the most daring and courageous among the students. At the farthest, but two more years will bring us to the limits of our shelf-room. Our present reading-room is far too small, and is really unfitted for the purpose. It is poorly lighted, and has only standing room for readers, and but little of that. The reading-table has not sufficient space for the proper arrangement of our magazines and exchanges.

FINANCIAL STATEMENT.

The following financial statement will show the expenditures for the year, and their relation to the inventory, June 30, 1887:

Inventory June 30, 1886:		
Books and pamphlets	$8,782 74	
Furniture	512 91	
Catalogue	963 83	
Other items	139 55	$10,399 03
Losses:		
Books worn out and lost	$15 50	
Binders worn out	2 14	17 64
Balance		$10,371 39
Increase for the year:		
Books purchased	$496 61	
Periodicals and pamphlets bound	362 00	
Books donated	54 50	
Increase by re-appraisement	696 16	
Work done on catalogue	215 80	
Permanent supplies, (cards)	12 00	
Cases	8 00	
Cash	1 00	1,846 07
Inventory June 30, 1887		$12,217 46
Cash expenditures:		
Books purchased	$496 61	
Periodicals	88 85	
Pay-roll, catalogue	215 80	
Pay-roll, labor and attendance	237 73	
Freight and express	14 10	
Supplies	30 60	
Department bills	18 05	$1,101 74

D. E. LANTZ,
Chairman of Library Committee.

COLLEGE, June 30, 1887.

DONATIONS.

From Hon. Jno. A. Anderson—Tenth Census Reports, Vols. 14, 15, 16, part 1, 18, part 1, and 20; Records of War of Rebellion, 6 volumes; Report of Secretary of the Treasury, 1885, 2 volumes; Report of Chief Signal Officer, 1885, 2 volumes; Report of Chief of Engineers, War Department, 1881, part 2; Report of the Comptroller of the Currency, 1882 and 1886; Report of Secretary of the Treasury, 1885, 2 volumes; Report of the Chief of Ordnance, 1886, 2 volumes; Constitutional Manual and Digest; Coast Survey, 1885; Patent Office Gazette and Index.

From Col. N. S. Goss, Topeka, Kansas — Birds of Kansas, 1886; A. O. U. Code and Check List of North American Birds.

From the Secretary of the Smithsonian Institution—Reports for 1884, parts 1 and 2; Report for 1885, part 1.

From Secretary of the Interior—U. S. Geological Survey, 1st Annual Report, 1880, Report of the Secretary of the Interior for 1882, Vol. 3; Report for 1883, Vols. 1 and 2; Report for 1884, Vols. 1 and 2; Report for 1885, Vols. 1 and 5.

From Prof. B. F. Coons, Mansfield, Conn.—Agricultural Reports of Connecticut, 7 volumes.

From Secretary Chas. Garfield—Michigan Horticultural Report for 1886.

From Lieut. W. J. Nicholson—Regulations U. S. Army; Chicago Medical Journal, 2 volumes; Courier of Medicine, 2 volumes; Chicago Medical Examiner, 1 volume; Annals of Anatomy and Surgery, 1 volume, unbound.

From Pres. Edwin Willets—Michigan Board of Agriculture, Report for 1886.

From Prof. E. M. Shelton—Census of Michigan, 1884, 2 volumes.

From Dr. S. W. Williston—Entomological Papers.

From Prof. Popenoe—Kansas School Laws, 1877.

From Prof. F. W. Cragin—Bulletins Natural History Survey of Washburn College.

From Prof. B. F. Nihart—Eaton's History of the Oil Regions; Phrenological Journal, volumes 80 and 81; Wilford's Microcosm, Vol. 3.

From Pres. Fairchild—Proceedings and Addresses, National Educational Association, 1886.

From Thomas Bassler—Cultivator and Country Gentlemen, Vol. 49.

From Prof. Walters—Plat-book of Riley County, Kansas.

From various State Officers and Secretaries—Kansas Horticultural Reports, 1885, 1886; Kansas Forestry Report, 1885; Kansas Agricultural Report, Vol. 10; American Horticultural Society's Report, Vol. 4; New Jersey Agricultural Report, 1885; Michigan Board of Agriculture, 1885; Agricultural Report of Wisconsin; Ontario Agricultural College Report, 1884; Report of Kansas State Board of Charities, 1886; Laws of Kansas, 1886; Report of Kansas Railroad Commissioners, 1886; Kansas State Historical Collections, Vol. 3; Second Entomological Report of New York; Massachusetts Horticultural Society's Transactions, 1885, 1886, part 1; Bulletins and Reports of American Museum of Natural History.

MILITARY DEPARTMENT, 1886–87.

No report was submitted by Lieut. W. J. Nicholson, Seventh U. S. Cavalry, for this his last year of detail as Professor of Military Science and Tactics, his records having been lost.

DEPARTMENT OF INDUSTRIAL ART AND DESIGNING, 1886–7.

To the Board of Regents—GENTLEMEN: I have the honor to submit the following report of the Department of Industrial Art and Designing.

During the school year 1886–87 I have taught classes as shown in this schedule:

TERMS.	POST-GRADUATES......	FREE-HAND.		MECHANICAL.				TOTAL......
		First Year.	*Advanced.*	*First Year.*	*Second Year.*	*Third Year.*	*Special.*	
Fall..	3	....	16	191	....	....	7	217
Winter....................................	2	146 *	12	11	....	....	3	174
Spring....................................	3	14	16	12	52 *	27 *	8	132
Totals....................................	8	160	44	214	52	27	18	523

* Of these classes, the first and third met in regular session Monday, Wednesday, and Friday of each week. On Tuesday and Thursday their attendance was not obligatory. The Second-year class in mechanical drawing was divided into two sections, each working half a term.

The classes in mechanical drawing used Prof. Morse's text-books, completing two books in each of the three terms given to this study.

The classes in primary free-hand drawing, after working a series of exercises from the blackboard, completed from one to three books of the "White Course," starting with the third book. The last two weeks of the term were given to work from simple models.

The advanced students in free-hand drawing, mostly young women, drew from models, casts, and lithographs. As most of their finished plates were on exhibition during commencement, I will not enlarge here upon this work.

The students enumerated in the column "Special" used a variety of text-books and books of reference, according to ability and intended vocation. The majority worked from Prof. Babcock's text-books of Elementary Architecture. One advanced student drew a set of original plans for a court-house, complete, with details and specifications.

The eight terms of post-graduate work shown in the schedule were taken by four students, and covered a wide range of free-hand and mathematical work, supplemented by extensive reading. One candidate for the second degree read Lübke's large History of Art, Ruskin's "Stones of Venice," and the "Seven Lamps of Architecture," Ware's Scenic Perspective, and five volumes of the works and lectures of Viollet Le Duc.

During the winter term each member of the class in surveying drew, under my supervision, a large map, 36x56 inches, of the College farm, as surveyed by the class during the fall term. Assistance was also given to the members of the class in engineering in the coloring and finishing of their theses plates. This work was done afternoons and Saturdays.

Of my work outside of the class-room, but in the interest of the College, permit mention of my attendance at the Farmers' Institutes at Osborne City, Manhattan, and Independence; at the State Teachers' Association in Topeka, and at the National Educational Association at the same place. At this latter meeting I had charge, as chairman of the committee, of the very successful exhibition of students' work of our institution, and was elected the Secretary for the year 1886–87 of the Industrial Section of the N. E. A. I have also performed the duties of the President of the Manhattan Horticultural Society, which holds its sessions in the Horticultural Hall of the College, so as to give the students an opportunity to attend and share in the discussions. During the summer vacation I superintended the building of Armory Hall and the construction of the new granary. In the spring of the present year I prepared a set of plans, with specifications, for the enlargement of the chapel, now in process of construction. I also edited a weekly column of "Kansas Educational Notes" for the *Industrialist.*

I have spoken in former reports of the crowded condition of the department, and as the classes are growing constantly — this year showing an increase of forty-nine pupils over last year, and of eighty-four over two years ago — I again invite your attention to this matter. The room in the attic, the plastering and finishing of which have been commenced, will give relief to the department as far as space is concerned, and permit the students of the third year to work on their large topographical and engineering plates undisturbed by the classes of the first and second year. There is, however, need of additional tables, shelves, and especially of lock drawers.

Respectfully submitted. J. D. WALTERS,
COLLEGE, June 30, 1887. *Professor of Industrial Art and Designing.*

DEPARTMENT OF TELEGRAPHY, 1886–87.

To the Board of Regents — GENTLEMEN: I herewith submit my eighth annual report of the Telegraph Department, covering the fiscal year ending June 30, 1887:

The enrollment for the year was sixty-one students, of whom seven were ladies and fifty-four gentlemen. By terms the enrollment shows as follows:

Terms.	*Ladies*	*Gentlemen*	*Totals*
Fall	4	37	41
Winter	4	34	38
Spring	1	10	11

Included in this enrollment are the four students assigned to type-writing during the greater part of the year.

As a matter of interest, I present a tabular view of the enrollment in this department for the past eight years, during which the department has been in my charge:

Years.	*Ladies......*	*Gentlemen...*	*Totals........*
1879-80	18	41	59
1880-81	29	46	75
1881-82	24	54	78
1882-83	26	56	82
1883-84	18	49	67
1884-85	8	42	50
1885-86	6	48	54
1886-87	7	54	61
Totals	136	390	526

The figures given in this table show the enrollment of different students for the years named — no student being counted more than once for the year, although his name may appear upon the roll for each of three terms in the year.

During the eight years, from 1879–80 to 1886–87, there have been enrolled in the Telegraph Department 348 different students. The attendance of these students covers 825 terms, or an average attendance of 2$\frac{43}{116}$ terms for each student. The longest period of attendance of any one student is twelve terms; the shortest is one week.

The following is a tabular view of the receipts and expenditures, in detail, of the department for the fiscal year just closed.

Attention is called to the fact that the expenditures for battery, line, instruments, and office wire, include in their scope the telegraph line proper, the telephone line, and the electric bell system connecting all buildings.

FINANCIAL STATEMENT.

DEBIT.		
To student labor	$93 30	
Type-writer supplies	4 00	
Battery supplies	27 72	
Freight and drayage	13 42	
Tacks, nails, and screws	95	
Telephone rental	40 00	
Refunded fees	1 50	
Line material	20 88	
Bells	3 85	
Instruments and office wire	10 36	
Department bills	20 98	
Inventory, June 30, 1886	974 85	
		$1,211 31
CREDIT.		
By cash received as fees	$222 00	
Cash for old poles	1 25	
Inventory, June 30, 1887	950 19	
		$1,173 44
Balance		$37 87

Under provision made by the Board, I have enjoyed the assistance of Miss Carrie F. Donaldson, of the class of '84, in the work of teaching in this department.

The type-writer, purchased in 1882, has been in constant use, not only in the construction of the library catalogue of subjects and authors, where it is especially valuable, but in the peculiarly wearing work to which it is subjected by students who are learning its use. This machine is a Remington No. 2, and it has stood this kind of usage for five years and given good satisfaction during a great portion of the time, with almost no expense for repairs. Although care has always been exercised in its use, it is now in a very bad condition, and will need considerable repairing before it is again fit for use. I would recommend that this machine be remodeled after the late styles of Remington type-writers, and kept for neat work required in the library and for letter-writing, and that a cheaper machine be purchased for the use of students in this department. No other requests are presented at this time.

As Instructor in Book-keeping and Commercial Law, I have to report a total enrollment for the year, in these studies, of 173 students. The assignment by terms and the division by sexes are here shown:

Terms.	*Ladies.*	*Gentlemen.*	*Totals.*
Fall	8	15	23
Winter	32	98	130
Spring	9	11	20
Totals	49	124	173

As the duties in this Department of instruction were assigned to me for the first time at the beginning of the present school year, it is perhaps proper to outline the work of the year. Beginning with a brief study of the form and use of the various commercial papers in common use, and the use and value of the simple cash account, the classes were at once put to work in double-entry book-keeping. Each class averaged about one set each week of the term, and the sets were made to cover as wide a range as practicable with the limited time available to the instructor. Special effort was constantly put forth to make the sets of practical use, and to give the accounts a personal value.

Supplementary to each term's work in book-keeping, was given a three-weeks course of lectures in commercial law, in which the subjects of contracts, negotiable paper, real property, interest, partnership, trespass, and others, according to the time available, were presented, with outline diagrams and written exercises for illustration. Although a very considerable addition to the work in my charge, it has added variety to my work, and has seemed to result in a fair degree of success.

With my work as Assistant Secretary of the Board you are, of course, familiar, through your quarterly and annual inspection of the accounts of the office, the monthly statement of the financial condition of the College, published in the *Industrialist*, and the annual statements published under your direction; and no further report is here presented.

The work as Secretary of the Faculty increases each year with the increased attendance, and in both offices with the general growth of the College, so that it has required the most constant attention to keep the work in hand. In this connection I may remark that the year just closed has been a remarkable one to me, in that I lost one day from my College duties on account of sickness. This is the first absence, from this cause, that has occurred since I first became connected with the College, eight years ago.

Other duties have claimed their share of attention. During the year I was continued in the chairmanship of the Faculty Committee on Examinations and Grades, in which it was my duty to have an oversight of all entrance and special examinations and the record and distribution of all students' grades. My membership of the Committee on Museums has not resulted in so large additions to the museums as has been the case in previous years, the most valuable addition, perhaps, being a peculiarly malformed specimen of long-billed gar-pike, which was presented, at my request, by Mr. M. H. Gardner, editor of the Baxter Springs *News*. I have also been a member of the Committee on Catalogue and Printing during the year.

By direction of the Faculty, I attended one of the series of Farmers' Institutes — the one held at Blue Mound — participated in by the College during the past winter. Also, by the same direction, it became my duty to deliver two lectures before the College in fulfilling the adopted scheme of public exercises. During about one-half of the school year it was my duty to read about one-third of the nearly five hundred exchanges received by the *Industrialist* each week, for the make-up of its outside pages. A pressure of other duties compelled a transfer of this work to other hands during the latter part of the year.

Altogether, the year has been a busy one — the busiest one in my connection with the College — and I have found but little time for outside work, which is usually profitable and welcome. I was reëlected treasurer of the Kansas State Academy of Science at its last meeting, held at Emporia, and was reappointed to the chairmanship of its section of Ichthyology. These, and the sinecure of tornado reporter for the United States Signal Service, are the only connections with outside work I have retained.

Respectfully submitted. I. D. GRAHAM,
Sup't of Telegraphy, Inst. in Book-keeping, Ass't Secy. of Board, and Secy. of Faculty.

COLLEGE, June 30, 1887.

DEPARTMENT OF MECHANICS, PHYSICS, AND ENGINEERING, 1886–87.

To the Board of Regents — GENTLEMEN: During the year I have given instruction in the following branches included in the Department of Mechanics, Physics, and Engineering, viz., trigonometry and surveying, physics, meteorology, mechanics, and civil engineering, and, in addition, taught a second-year class in rhetoricals during the year, and two classes in arithmetic during the winter term, and one class in arithmetic during the spring term. Three graduates of the College pursued advanced studies in this department. One of these, Mr. F. J. Rogers, received the post-graduate degree of Master of Science at our last Commencement.

SCHEDULE OF CLASSES.

Studies.		*Males.*	*Females.*	*Total.*
FALL TERM.				
Trigonometry and Surveying, two sections	Third-year class	28	13	41
Physics and Meteorology	Fourth-year class	19	2	21
Rhetoricals	Second-year class	16	9	25
WINTER TERM.				
Mechanics, two sections	Third-year class	27	10	37
Arithmetic, two classes	First-year class	35	30	65
Rhetoricals	Second-year class	13	14	27
SPRING TERM.				
Physics	Third-year class	20	8	28
Civil Engineering	Third-year class	23	....	23
Arithmetic	First-year class	14	9	23
Rhetoricals	Second-year class	9	10	19

The class-work in trigonometry consisted in demonstrations of the principles of the science, and the application of these principles by the aid of logarithms to the solution of practical problems. The work extended over plane trigonometry, with an introduction to spherical trigonometry.

The class-work in surveying was devoted to study of the instruments used, of the plan and markings of the U. S. Government surveys, and how to retrace them, of U. S. survey field-notes, and of methods of measurement and computation. During the entire term the class was divided into eight squads for field practice with the excellent instruments with which this department is provided. A wall-map of the College farm was made by each member of the class during the winter term, from surveys made during the fall term.

During the first ten weeks of the fall term the class in physics and meteorology carried forward the study of physics from the point at which they had left it at the close of the spring term of 1886, giving attention to the subjects of light and electricity. The last four weeks of the term were devoted to the subject of meteorology.

The subject of mechanics, embracing an investigation of the laws of force and motion, was studied by the members of the third-year class during the winter term.

During the spring term, the third-year class began the study of physics. The subjects of sound and heat were considered, and the subject of light was entered upon. The principles discussed in the text were illustrated by numerous experiments, and explained by lectures before the classes in physics of both the fall and spring terms.

Civil engineering was studied by the young men of the third-year class during the spring term. Each member of the class prepared a thesis, illustrated by drawings, on some engineering subject selected by himself.

Other work of the year consisted in taking the meteorological observations, regular contributions to the editorial columns of the *Industrialist*, attendance at two farmers' institutes, two lectures in chapel before the whole body of students, committee work, etc. A portion of the last vacation was used in devising and constructing a pendulum apparatus for illustrating vibratory motions, and in experiments upon some problems of magnetism. The results of the latter have not yet been made sufficiently definite for publication.

The last Legislature made an appropriation of one thousand dollars for the purchase of apparatus for this department. One-half of this sum becomes available at this date. An order has already been placed, as authorized by the Board at its April meeting. A portion of the apparatus will have to be imported, but the prompt action of the Board in authorizing the purchase will insure its arrival at the College in time for the work of the fall term.

FINANCIAL STATEMENT.

DEBITS.		
Inventory, 1886	$1,809 00	
New apparatus, supplies, and repairs	24 95	
Lecture table and fixtures	31 30	
Student work on meteorological records	19 80	
Stationery and postage	7 30	
CREDITS.		
Inventory, 1887		$1,857 50
Balance		34 85
Totals	$1,892 35	$1,892 35

Respectfully submitted. E. B. COWGILL,
Professor of Mechanics, Physics, and Engineering.

COLLEGE, June 30, 1887.

DEPARTMENT OF PRINTING, 1886–87.

To the Board of Regents—GENTLEMEN: Herewith is submitted a brief report of work done in the Printing Department covering that part of the College year ending January 14, 1887.

The enrollment during the fall term was fifty-three—seventeen young women and thirty-six young men. No new features were introduced into the work this year, but it was carried on as heretofore. The classes of the winter term had not become settled when my successor took charge, so I leave the report of that term to him.

The books in the office will show itemized accounts of all expenditures and receipts. A correct showing of receipts cannot be made until the end of the year, as several jobs of work were left incomplete, but below is a statement of expenditures:

Student labor	$426 55
Paper	265 76
Freight and expressage	59 98
Type, etc	85 25
Department bills	25
Postage, box rent	15 84
Incidentals	20 20
Total	$873 83

My resignation the Board accepted at a former meeting. I do not withdraw from the work at the College without keen regret. The years I have spent in this institution have been of incalculable benefit to me, and in my work I have endeavored to do the best I knew how. I have always been treated with kindness by Regents and members of the Faculty. I believe work in another field will suit my inclination better, and this belief prompts my resignation. I shall have more than a common interest in the welfare of the College, and especially of the Printing Department.

Respectfully submitted. GEO. F. THOMPSON,
COLLEGE, January 14, 1887. *Superintendent of Printing.*

To the Board of Regents—GENTLEMEN: I took charge of the Printing Department on the 17th of January last. It gives me pleasure to state that my predecessor left the office in the best possible condition, there being "a place for everything and everything in its place."

In the winter term, there were enrolled in the department 82 students, of whom 10 were young women and 72 young men. The enrollment in the spring term was 48, of whom 11 were young women and 37 young men.

The progress of the students has been quite satisfactory to me. The work of teaching being new to me, I did not venture upon any new features. I shall, however, introduce a number next year, among them color-printing from blocks of various kinds, which will be made by the students themselves. Instruction in color-printing from blocks will be given only to students who desire it, and can devote to it a few hours of extra time every week for necessary drill. I have also planned lessons in display composition by means of labor-saving lines which I have prepared in great variety. I hope by the use of these lines to gain time for the students, and save much of the useless wear and tear of type and presses.

There has been but little work done by the department. The two large editions of the *Industrialist* for advertising purposes, 5,000 copies of the annual catalogue, 500 copies of a 96-page pamphlet for the use of the rhetorical classes, 250 copies of an 80-page pamphlet for the Webster Literary Society, and 200 copies of a 16-page pamphlet for use in the entomology classes, with the regular weekly issue (about 1,500 copies) of the *Industrialist*, comprise the department work for the year.

Following is the financial statement of the department as shown by the Secretary's books:

FINANCIAL STATEMENT.

DEBITS.		
Inventory, 1886	$3,229 63	
Cash expenditures	1,981 48	
Department bills	14 07	
CREDITS.		
Inventory, 1887		$3,082 78
Cash receipts		642 35
Department bills		919 95
Balance		580 10
Totals	$5,225 18	$5,225 18

The balance of $580.10 represents the expense of the *Industrialist* for the year: cost of student labor, paper, rollers, ink, oil, repairs, etc. The following items of expenditure date from January 20th, 1887:

Student labor	$434 50
Paper	509 02
Freight, expressage	70 89
Drayage	2 00
Type, rollers, staples, oil, glue, etc	65 49
Postage, box rent	22 96
Incidentals	2 79

Respectfully submitted.
COLLEGE, June 30, 1887.

J. S. C. THOMPSON,
Superintendent of Printing.

DEPARTMENT OF ENGLISH AND HISTORY, 1886-87.

To the Board of Regents—GENTLEMEN: I have the honor to present the following report of my work for the past year, as Professor of English and History.

The studies that fall in my department are in the first and third year of the College course; and all the students of those years recite to me in some branch each term of the year.

Below is a summary of classes and enrollment:

TERMS.	*Males.*	*Females.*	*Total.*
Fall Term.			
English Analysis (3 divisions)	124	56	180
General History	22	16	38
Rhetoricals of first and fourth-year classes (4 divisions)	140	61	201
Winter Term.			
English Structure (3 divisions)	135	69	204
Rhetoric	23	11	34
Rhetoricals of first and fourth-year classes (4 divisions)	134	55	189
Spring Term.			
English Composition (3 divisions)	96	44	140
English Literature	20	9	29
Rhetoricals of first first and fourth-year classes, (4 divisions)	98	37	135

The English work of the first year is continuous. The principal work of the fall term is to study the elements and the construction of the sentence, together with the inflectional changes of the parts of speech made necessary by their uses. From the time given to the work, this could be little more than a review, and a gathering of facts already learned; but I tried to make it a thorough and practical one. The winter work was the study of the origin, meaning, and construction of the common derivative words of the English language. The constant endeavor was to get a better knowledge of the meaning and force of words, and to secure greater precision in their use. The term's work closed with lectures, summing up the elements, the history and the changes of our language. The work of the spring term was the elements of rhetoric, together with the synthesis of sentences, paragraphs, and themes. While bearing upon the expression of thought smoothly and effectively, careful attention was given to capitalization, punctuation, and the different forms of sentence. "Kellogg's Rhetoric" was the text-book used. In order to have the English work of this year as closely related as possible, the rhetorical work of this class was given wholly to my department. One recitation in each week was given to declamation and composition work, with good results.

The third-year class studied in my department, in the fall term, the outlines of the world's history. We used "Swinton's Outlines" as a text-book, referring to the library and the atlas. The aim was not so much to amass facts as to see the general story of the nations, and to get such a knowledge of cause and effect in national life as will make the future reading of history pleasant and profitable. In the winter we studied higher rhetoric, using as a text-book "Hill's Principles of Rhetoric." In the spring term we studied the history of English literature, grouped the authors by time and character of work, and made a study of the works of the most noted. "Kellogg's English Literature" is the text-book for this term.

The Third-year class in my department was in one division throughout the year, and the first-year class in three, giving me four hours of class work each day.

The fourth-year class in rhetoricals was placed in my department this year, meeting once each week.

I attended one of the institutes held by the College.

Respectfully submitted. O. E. Olin,
College, June 30, 1887. *Professor of English and History.*

DEPARTMENT OF HOUSEHOLD ECONOMY AND HYGIENE, 1886–87.

To the Board of Regents—Gentlemen: The following report of work done in the Department of Domestic Economy during the year ending June 30, 1887, is respectfully submitted:

During the fall term, the class of fourth-year girls in English literature was very small, numbering but four members. Still the work was pleasant and profitable. Because of the small number, much time could be given each one in expression of opinion, much essay-writing being done upon difference of style noticed among authors, and the growth of our literature was pleasantly noted through some of the best English writers from the time of Chaucer to the present day. That term also gave me a class of "B" students in arithmetic, and a class of second-year students in rhetoricals. This latter class met once a week, and each student had either a recitation or an essay once in two weeks, rehearsing to me before coming to class.

During the winter term, the class in household economy numbered twenty-eight, and I had under my direction two ladies taking post-graduate work in this department. The twenty-eight girls in the regular class did a large amount of cooking, and prepared the regular Monday dinners for several members of the Faculty, the Friday lunches for both students and Faculty, and one evening party, as well as the banquet, teas and lunches of which the Regents have personal knowledge. Besides the usual winter work, this class, at the end of the spring term, cooked the food and prepared the supper for the Alumni Association, arranging tables for 150 guests and waiting upon them, serving the supper deftly and comfortably for all.

The spring term gave me a class of "B" students in English, where the work was largely drill in reading and strengthening the memory. My regular work in this term consists of a third-year class in hygiene, and a second-year class in dairying. The third-year girls listened to ten weeks of lectures, then wrote three essays each, upon assigned topics which all related to the having and keeping of health.

The class in dairying numbered twenty-one, and made during the term 113 pounds of butter, several cheeses, and spent some hours making cottage cheese. The dairy work was not so satisfactory as last year, because of the limited supply of milk. The cost of the milk this year was greater per pound than that furnished us last year, while the price of the butter made remained the same. Until some plan can be devised to have more milk than is obtainable at present, the dairy class will not be fully satisfactory.

The following summary will show the direction of expenditures during the year:

FINANCIAL STATEMENT.

DEBITS.		
Materials for cooking	$220 15	
New equipment	10 95	
Milk (from Farm Department)	76 37	
Student labor	27 25	
Ice	2 85	
Paper	2 15	
Repairs	5 40	
CREDITS.		
Cash, lunches and dinner		$183 25
Cash, butter		28 25
Washing		21 20
Increase of inventory		11 25
Balance, expense		101 12
Total	$345 07	$345 07

A considerable part of this expense is accounted for in the price paid for milk to the Farm Department.

The washing of towels for the institution, as well as of napkins, tablecloths and tea-towels for the kitchen laboratory, has been done by young ladies who were members of the second-year class, and has been paid for at regular rates for student labor.

During the year I have taken my share of College work outside of my department, having attended two of the Farmers' Institutes, lectured once in chapel, and written in my turn on the *Industrialist* corps.

The work in the kitchen laboratory has been quite successful in every way. The fact that one of our young lady graduates has lately been elected acting Professor of Domestic Economy in the Dakota Agricultural College, and asked to model her department after the one in this College, is very gratifying, and as the years go by and the work grows larger it is to be hoped that the influence for good work among the women of Kansas will increase even faster than in past years. The liberal action of the Board in all respects keeps the department in good working order.

Respectfully submitted. NELLIE S. KEDZIE,
COLLEGE, June 30, 1887. *Professor of Household Economy and Hygiene.*

DEPARTMENT OF SEWING, 1886–87.

To the Board of Regents — GENTLEMEN: The following report of my work in the Sewing Department for the year ending June 30, 1887, is respectfully submitted.

I have had five classes each day during the entire College year, and have had two post-graduates under my instruction, one with especial reference to fitting herself for conducting a similar department in another college.

ENROLLMENT.

Terms.	*No.*
Fall	82
Winter	56
Spring	40

The enrollment for the spring term was not as large as usual, many having to leave on account of sickness.

During the year we made over 500 articles, about 141 of them dresses. Twenty-five young ladies learned to cut and fit dresses.

The ladies of the graduating class made their own dresses, and the dresses of the ladies taking part in the Third-year Exhibition were made in the department.

Our work comprises all kinds of sewing, both plain and fancy; knitting mittens and stockings, crocheting hoods and scarfs, and making all kinds of useful articles. Many of the young ladies bring the materials from home, and make their own clothing for the school year.

FINANCIAL STATEMENT.

The following will show, somewhat. the line of expenditures during the last year:

DEBIT.		
To inventory	$519 92	
Materials	24 20	
Gas stove	2 50	
Freight on same	1 00	
Department bills	7 05	
		$554 70
CREDIT.		
By cash	$2 00	
Department bills	4 00	
Inventory	509 95	
		515 95
Balance—expense		$38 75

This sum represents the actual cost of the department in the way of incidental expenses, the general expense of instruction and class-room heating being charged, as in other cases, to separate funds, as shown elsewhere.

Respectfully submitted. ELIDA E. WINCHIP,
COLLEGE, June 30, 1887. *Superintendent of Sewing.*

MECHANICAL DEPARTMENT, 1886–87.

To the Board of Regents—GENTLEMEN: I have the honor of presenting the following report of the Mechanical Department for the year ending June 30, 1887.

The year opened with a class of 155, four of whom were in the blacksmith shop.

A systematic course was mapped out for the beginners in this work, and adhered to throughout the year. All students below the fourth-year are employed, during practice hours, on work laid out by myself; and every inducement is offered for students to spend unoccupied time in the shop on work of their own. The enrollment for the winter term was larger than at any previous time, taxing the capacity of the shop to the utmost, and making apparent the necessity of increased facilities for the coming year. In the winter term, there were 156 in the carpenter shop and 11 in the blacksmith shop. There were 83 in the carpenter shop during the spring term. The third-year class have been instructed in saw-filing, and building from plans, including roof problems.

In addition to this work, I have done a share of the *Industrialist* writing, and designed and superintended many of the improvements about the institution.

Immediately after Commencement, I went to Cincinnati to purchase machinery, as authorized by the Board. The tools were purchased from four different firms, three of whom are in Cincinnati, and were selected with regard to utility of adjustment, workmanship, compactness of design, and price. The objects for which I went were satisfactorily attained. Below is a list of tools as purchased. In order to accommodate our new tools and at the same time to increase our number of benches, the interior of the shop must be entirely rearranged, and new designs of benches substituted for the old.

TOOLS PURCHASED.

Band saw, 34-inch, Deitz, Woerman & Co., Cincinnati	$85 00
Planer, 24-inch, pony, Deitz, Woerman & Co., Cincinnati	130 00
Lathe, 20-inch, Deitz, Woerman & Co., Cincinnati	55 00
Freezer, single spindle, Cordesman, Mayer & Co., Cincinnati	95 00
Double circular saw, J. A. Fay, Cincinnati	213 75
Swing lathe, 9-inch, 4-foot bed, Rose Polytechnic Shops, Terre Haute, Ind	35 00
Small speed lathe, Rose Polytechnic Shops, Terre Haute, Ind	18 00

Other small tools and attachments were bought, and will be in place by the opening of the term in September.

FINANCIAL STATEMENT.

EXPENDITURES.		
Bills paid to hardware	$269 17	
Bills paid to lumber	491 79	
Miscellaneous	120 71	
Pay-roll, students and men	1,003 86	
Department bills	19 00	
		$1,904 53
RECEIPTS.		
Cash	$201 65	
Department receipts	470 40	
Bills against appropriation	435 52	
Bills receivable	117 47	
Increase in inventory of tools	43 48	
		$1,268 52
Balance		$636 01

This amount has been used in furnishing stock for students' practice, for assistance in instructing, for buying new tools, and repairing and keeping in order all apparatus of the shop.

Respectfully submitted.

O. P. Hood,
Supt. of the Mechanical Department.

College, June 30, 1887.

DEPARTMENT OF MUSIC, 1886–87.

To the Board of Regents—Gentlemen: The following report will show the number of pupils enrolled, the work done in the Musical Department, and its needs.

SCHEDULE OF CLASSES.

Studies.	*Females.*	*Males.*	*Total.*
Fall term:			
Piano pupils	23	5	28
Organ pupils	9		9
Violin pupils		3	3
Cornet pupils		1	1
Singing class "A"	14	25	39
Singing class "B"	29	52	81
College orchestra			10
College C. C. Band			9
Total for term			180
Winter term:			
Piano pupils	16	5	21
Organ pupils	5	3	8
Violin pupils	2	3	5
Cornet and horns pupils		5	5
Clarinet pupils		1	1
Voice-culture pupils	1	2	3
Singing class "A"	12	15	27
Singing class "B"	23	34	57
College orchestra			13
College C. C. Band			12
Total for term			152
Spring term:			
Piano pupils	15	4	19
Organ pupils	4	3	7
Violin pupils	3	5	8
Viola pupils		1	1
Violoncello pupils		1	1
Cornet and horns pupils		7	7
Flute pupils		1	1
Clarinet pupils		1	1
Voice-culture pupils	3	8	11
Singing class "A"	18	17	35
Singing class "B"	4	6	10
College orchestra			20
College C. C. Band			19
Total for term			140

An examination of the above schedule shows a large increase of attendance in the department. The number of lessons taken and the variety of instruments used shows a corresponding increase of enthusiasm.

In addition to the daily chapel exercises, the four weekly singing classes, class-room and other regular duties, the department has furnished music as follows: For Thanksgiving social, six numbers, vocal and instrumental; for the Alpha Beta exhibition, one selection by the orchestra. During the winter term furnished music for the drama, "King Alfred," given at the regular College social; also one selection by the orchestra for the exhibition of the Webster Society. At the spring-term social the College C. C. Band furnished three numbers, the College Orchestra two, and the Singing Class one; for the Baccalaureate sermon, two numbers by the Singing Class and orchestra; for the Undergraduates' exhibition, five numbers, vocal and instrumental; for the annual address, two numbers; for Commencement exercises, six numbers, four vocal and two instrumental; for the military drill of College Cadets, five numbers were furnished by the College Cadet Cornet Band.

This work has been done in spite of serious deficiency in the equipment of the department. To keep pace with its growth and enthusiasm a full equipment and an increase of facilities for practice are pressing necessities.

Respectfully submitted.
A. B. BROWN,
Professor of Music.

COLLEGE, June 30, 1887.

ANNUAL REPORTS

OF

COLLEGE DEPARTMENTS.

1887-88.

REPORTS.

PRESIDENT'S REPORT, 1887–88.

To the Board of Regents— GENTLEMEN: I present you in brief, a report of the Executive Department for the year ending June 30, 1888, referring you to the special reports of the several Professors and Superintendents for the details of College affairs outside of my department proper.

The general management of the College discipline has been, as heretofore, with the Faculty; in that body there have been a few changes, as follows: Prof. E. B. Cowgill resigned the chair of Physics and Engineering, September 1, and Mr. F. J. Rogers was appointed Instructor, with special reference to the classes in physics, while the classes in mechanics and engineering were assigned to Supt. Hood, with the title of Instructor, and the classes in trigonometry and surveying were assigned to the Professor of Mathematics. Lieut. J. F. Morrison, of the 20th U. S. Infantry, succeeded to Lieut. W. J. Nicholson, of the 7th Cavalry, in the chair of Military Science and Tactics, by detail under the United States law at your request, and entered upon duty with the beginning of the year. In May there was added to the Faculty a Professor of Physiology and Veterinary Science, in the person of Dr. R. F. Burleigh, of New Hampshire. In connection with the addition of the Experiment Station to the work of the College, relief was called for in various departments in order that the professors in charge might give time to the experiments provided for in the organization of the station. The Professors of Agriculture, of Agricultural Chemistry, of Horticulture, and of Botany, were assigned duties in the station, and relief in the future has been provided by your action in establishing a professorship of History and Constitution, and employing Professor Morrison for extra teaching.

All action of the Faculty has shown the utmost unanimity and carefulness.

The Faculty has held regular weekly meetings, as heretofore, and has been organized for general executive duties into the following standing committees:

Public Exercises—Professors Shelton, Olin, Kedzie, and Brown.

Post-Graduate Courses—Professors Popenoe, Shelton, Failyer, Kellerman, and Walters.

Examination and Grades—Secy. Graham, Professors Lantz, Olin, and Rogers.

Farmers' Institutes—Professors Failyer, Shelton, Popenoe, and Kedzie.

Museums—Professors Kellerman, Failyer, Popenoe, and Secy. Graham.

Library—Professors Lantz, Shelton, Failyer, and Olin.

Social and Literary Entertainments—Professor Kedzie, Superintendent Winchip, Professor Brown, and Lieutenant Morrison.

Buildings—Superintendent Hood, Professors Walters, Failyer, Popenoe, and Kellerman.

Catalogue, Blanks, &c.—Superintendent Thompson, Secy. Graham, Professor Walters, and Lieutenant Morrison.

A few changes have occurred among assistants in the various departments, Mr. C. M. Breese taking the place of Mr. J. T. Willard in the Chemical Department, and Mr. J. G. Harbord that of Miss Carrie Donaldson in the Library. Mr. G. N. Thompson was made foreman in the Mechanical Department, having acted in that capacity during his last year as a student. Some assistance in teaching and oversight was given by students during the year. Mr. D. W. Working, jr., acted as foreman in the Printing office, and Mr. E. F. Nichols assisted in the Chemical Department; both were members of the fourth-year class. Mr. A. C. McCreary was appointed to the place of Janitor in August, and has proved well suited to the place.

The total attendance for the year in the various classes has been as follows:

Classes.	*Gentlemen..*	*Ladies.......*	*Totals........*
Fourth-year	20	7	27
Third-year	28	18	46
Second-year	65	27	92
First-year	199	106	305
Totals	312	158	470

From 67 counties of Kansas, 435; from 14 other States, 35. Applicants not enrolled, 31.

Average ages: Fourth-year, 21.88; Third-year, 20.06; Second-year, 19.02. General average, 19.36.

The following lists show the representation of the various counties of this State and of other States:

Kansas Counties—Anderson 3, Atchison 9, Barton 2, Bourbon 1, Brown 11, Butler 3, Chase 2, Chautauqua 1, Cherokee 2, Clay 10, Cloud 2, Coffey 2, Cowley 5, Crawford 3, Davis 5, Dickinson 4, Doniphan 1, Douglas 3, Elk 4, Ellis 1, Finney 2, Franklin 3, Graham 2, Greenwood 4, Harvey 1, Jackson 10, Jefferson 9, Jewell 3, Johnson 2, Kingman 1, Kiowa 1, Labette 3, Leavenworth 5, Lincoln 3, Linn 7, Lyon 3, McPherson 4, Marion 1, Marshall

9, Miami 1, Mitchell 1, Mortgomery 1, Morris 6, Nemaha 4, Neosho 1, Ness 1, Norton 1, Osage 6, Osborne 11, Ottawa 8, Pawnee 1, Phillips 1, Pottawatomie 22, Reno 1, Republic 9, Rice 1, Riley 147, Rooks 1, Rush 2, Russell 1, Shawnee 10, Smith 3, Stafford 2, Sumner 2, Wabaunsee 16, Washington 6, Wilson 4, Wyandotte 10.

Other States—California 1, Colorado 1, England 1, Germany 1, Indian Territory 4, Illinois 7, Michigan 1, Missouri 7, Nebraska 4, New Jersey 2, New York 2, Pennsylvania 2, Utah 1, Wales 1.

Compared with the average for the eight years immediately preceding this, the showing is given in tabular form below:

Classes.	*Totals.*	*Average No. 1880 to 1887.*	*1888.*
Post-graduate	25	3.13	2
Fourth-year	125	15.63	27
Third-year	249	31.00	46
Second-year	573	71.50	92
First-year	1,956	244.50	305
Totals	2,928	366.00	472

Other facts for comparison with the records of previous years are here given:

	1880.	*1881.*	*1882.*	*1883.*	*1884.*	*1885.*	*1886.*	*1887.*	*1888.*
Per cent. of ladies to total enrollment,	26	33	28	33	34	30	30	32	33
Per cent. of new students to total enrollment	....	55	64	56	57	56	54	54	56
Average age of enrolled students	18.86	18.84	19.35	18.81	19.09	19.59	18.98	19.41	19.36
Counties in Kansas represented	48	44	54	50	55	61	60	66	67
Other States represented	8	5	13	13	10	14	18	15	14

Of the whole number, 265 are here for the first time, and there came from city and district schools, 231; from other colleges, 28; from private schools, 4; from county normal institute, 1; and from a convent, 1.

One hundred and fourteen of these young people are dependent, in whole or in part, upon their own exertions while here for financial support, 144 are supported by parents, and 7 by other relatives.

One hundred and forty-one of these new students plan to take the full course of four years, and one hundred and twenty-four plan shorter courses.

The nativity of the new students is as follows: Canada, 2; Colorado, 1; Connecticut, 2; England, 3; Illinois, 31; Indiana, 15; Indian Territory, 1; Iowa, 18; Kansas, 126; Kentucky, 2; Maryland, 2; Massachusetts, 3; Michigan, 4; Mississippi, 2; Missouri, 9; Nebraska, 1; New Hampshire, 1; New York, 9; Ohio, 12; Pennsylvania, 9; Rhode Island, 1; Tennessee, 3; Texas, 1; West Virginia, 1; and Wisconsin, 6.

Their parents are engaged in business as here shown: Bankers, 3; bookkeeper, 1; butcher, 1; clerk, 1; carpenters, 6; doctors, 3; druggists, 3; dairymen, 6; dentists, 2; day-laborers, 3; electrotyper, 1; editors, 4; farmers, 169; fruit-grower, 1; gardener, 1; hotel and boarding-house keepers, 4; insurance agent, 1; judges, 2; land agents, 2; liverymen, 2; lawyers, 3; merchants (including grain, lumber and coal dealers), 22; ministers, 6; millers, 3; masons, 2; not given, 6; photographer, 1; retired, 1; surveyor, 1; tinners, 2; teachers, 2.

Although this shows an apparent diminution in numbers, the actual falling-off, except in post-graduates, is nothing. The preparation shown upon admission has been fully equal to that of any other year, and perhaps better. The special classes provided for young men over eighteen years of age and young women over sixteen have been found necessary as usual, although the number assigned to these classes has not been great. It is to be hoped that, with the growth of the State and a full and satisfactory provision in the public schools, no such need will be felt. At present there seems to be a necessity to provide for these full-grown men and women who have had almost no education elsewhere, although they lack somewhat the preparation required for entering upon the present course of study.

The number of daily classes in the several terms were as follows: In studies of the course — Fall term, 34; winter term, 38; spring term, 30. Industrial classes — Fall term, 19; winter term, 19; spring term, 19. Of weekly or semi-weekly classes there were in each term 7. Many of these classes were too large for best work, several having more than fifty members enrolled. Provision has been made for such a use of the teaching force as to give smaller divisions next year.

The usual routine of exercises has been followed with little change. The provision for public lectures and rhetorical exercises, as well as that for weekly drill of all the classes in essay-writing and declamation, tried last year, was found so satisfactory as to lead to its continuance this year. According to this plan, all classes have weekly drill, and each Friday afternoon a lecture from some member of the Faculty, or an exercise furnished by the fourth-year and third-year classes, is given before the whole body of students, time not to exceed one hour.

The lectures of the year have been as follows:

September 23d, "The Jews," by Professor Olin.

October 7th, "The True Patriot," by President Fairchild.

October 21st, "How Every Man Makes His Own World," by Rev. D. C. Milner; substitute for Mrs. Winchip.

November 4th, "A Bit of Iron," by Superintendent Hood.

November 18th, "An Evening with Ole Bull," by Rev. Robert Brown; substitute for Professor Brown.

December 10th, "Life and Works of Francis Bacon," by Chancellor Lippincott of the State University, at the invitation of the Faculty.

January 6th, "The Industrious Woman," by Superintendent Thompson.

January 20th, "Army Life," by Professor Morrison.

February 3d, "On the Fence," by Mr. Rogers.

February 17th, "Division of Forces," by Mrs. Kedzie.

March 2d, "The Independent in Politics," by Professor Shelton.

March 16th, "The Unity of Nature," by Professor Kellerman.

March 30th, "The Little Great Things in Science," by Professor Failyer.

April 13th, "Our Prairie World," by Rev. J. D. Parker, substitute for Professor Popenoe.

April 27th, "Wonderland," by Hon. A. R. Greene, Railroad Commissioner, at the invitation of the Faculty.

May 11th, "Novel Reading," by Professor Lantz.

May 25th, "Inventions," by Professor Walters.

In addition to these regular lectures, the Alpha Beta Society provided on May 24th a public lecture, delivered by Rev. A. S. Embree, of Manhattan, upon the topic, "Learning without thought is labor lost; thought without learning is perilous." The Webster Society also gave their annual lecture to the public on June 2d; Rev. W. H. Ray, of Topeka, addressed them upon the topic, "Thinking to Thrive." Of other evening entertainments, educational in their character, we have had exhibitions of three literary societies, and the usual provision under the standing committee of the Faculty for social acquaintance, by a gathering, each term, in the College building, to which all the students, parents of the students, and graduates of the College, have been invited. These College socials have been held on the evening of Thanksgiving Day, the evening of Washington's Birthday, and the evening of May 18th.

The general health of the students has been up to the standard of the past ten years; with the exception of an epidemic of the mumps in the winter and early spring there has been no general sickness. One death has occurred from typho-malarial fever. This case occurred two weeks after the beginning of the year, and death resulted from feebleness of long standing. This is the third death among students during the past nine years.

The general discipline of the College has not varied from that of past years. The requirements as to the general character and attendance upon duties have been the same as heretofore; one case of suspension on account of plagiarism, and false statements in regard to the matter upon the charge being brought home, is the only instance of serious penalty. In a few cases a private reprimand for minor offenses has been ordered by the Faculty. It may be well to state that the moral influences surrounding students at the College are excellent, and that the people of Manhattan are generally united in the effort to maintain good order and good character among the students. Nothing has occurred to bring contention between the people and the College students in any particular, and the students are encouraged to regard themselves as subject to the general laws like all good citizens.

The annual commencement at the close of the year included the ordinary exercises. The Baccalaureate sermon was given as usual by myself in the College chapel; the annual address was delivered by Hon. H. A. Burrell, of Washington, Iowa, who had for his subject "The Good of Evil." Both the sermon and the address have been published in the *Industrialist* by your orders, and 500 copies of the address were put in pamphlet form.

The exhibition of the third-year class was prepared under direction of Professor Shelton, and the commencement orations, prepared and delivered by all of the graduates, were under the direction of Professor Olin. The graduating class numbered 22, all of whom received, upon recommendation of the Faculty and by your orders, the degree of B. S., as follows:

Grant Arnold	Clay Center, Clay.
Bertha H. Bacheller	Lyons, Rice.
Clement G. Clark	Manhattan, Riley.
Alexander C. Cobb	Gibson Station, Indian Territory.
Mattie Cobb	Gibson Station, Indian Territory.
Minnie H. Cowell	Wakefield, Clay.
Lyman H. Dixon	Bent Cañon, Colorado.
David G. Fairchild	Manhattan, Riley.
Carl E. Friend	Holton, Jackson.
John R. Harrison	Manhattan, Riley.
Humphrey W. Jones	Manhattan, Riley.
Nathan E. Lewis	Auburn, Shawnee.
Abbie L. Marlatt	Manhattan, Riley.
William C. Moore	Delphos, Ottawa.
Ernest F. Nichols	Leavenworth, Leavenworth.
Harry E. Robb	Neal, Greenwood.
Anna Snyder	Oskaloosa, Jefferson.
Edwin H. Snyder	Geuda, Sumner.
Oliver L. Utter	Republic, Republic.
Aaron Walters	Luray, Russell.
Lora L. Walters	Weston, Davis.
Daniel W. Working, Jr	Logan, Phillips.

Allan Lewis, of the class of 1885, having been recommended by the Faculty as worthy of the degree of M. S., for proficiency in physics and engineering, was granted the same by your order.

The College has been represented in various important associations outside the routine work; several members of the Faculty took part in the State Teachers' Association; two members were in attendance upon the National Teachers' Association at its meeting in Chicago; some have shared in the meeting of the State Board of Agriculture at Topeka, and some in the meetings of the State Horticultural Society. The State Academy of Science has two of its officers and a half-dozen or more of its members in our Faculty, and various agricultural associations have had assistance and encouragement of one or more of the Professors at their various meetings. The Farmers' Institutes, in which the College had responsibility directly, were as follows: Seneca, December 1 and 2, 1887; Lakin, December 8 and 9, 1887; Great Bend, December 7 and 8, 1887; Wabaunsee, December 22 and 23, 1887; Walnut, January 26 and 27, 1888; Oak Grove, January 19 and 20, 1888; Wakeeney, February 3 and 4, 1888; Wellsville, February 23 and 24, 1888.

These were generally successful, and the extra number is evidence of more than usual interest among the people. In addition to these, in which two or more members of the Faculty were present, several others called for the presence of a single member at the expense of the locality. Members of the Faculty also took part in the annual institute held at Manhattan. During the past seven years the College has shared responsibility for forty-two institutes in thirty-five different towns and twenty-nine counties. The instances where a second institute has been held in the same places are not many, although without exception the second has shown a great gain in interest over the first. The general feeling still remains that the College should undertake only so much of such work as can be fully carried out without serious interference with the every-day work of instruction at home.

The *Industrialist* has been managed as usual, in the interests of the College solely; the weekly issue is now in the neighborhood of 2,000 copies. The members of the Faculty have taken their places in routine as editors under my general management, and the paper has received marked attention all over the country as the exponent of the actual work of the College.

Personal Duties.—My classes have been the usual ones, in psychology, logic, and political economy, made up of the members of the fourth-year class, and numbering about 25. There has been no change in the usual range of work. The general correspondence in my charge has been extensive, though not more burdensome than it has been in the past years.

The general accounts of the College have been as usual under my supervision, and my signature has been attached to every voucher for expenditures. But the books have been kept as usual, by Secretary Graham, in such shape as to require little of my attention outside of an occasional comparison of statements for verification.

The general reports and matters provided for by special appropriations and placed in charge of the standing committees of the Board, have been left under my general direction by those committees, after consultation as to the matters to be undertaken.

The duties of the students, their assignment to classes, and the general responsibility for good order, rested as usual with me, though every member of the Faculty has been ready to share as seemed desirable.

As managing editor of the *Industrialist* I have furnished the larger part of local items, and selected the most of the miscellaneous matter provided by the associate editors. I am indebted, however, to several of the professors, and especially to Secretary Graham, for many items of interest, and to Prof. Walters for the column of Kansas educational news. For the general improvement in the make-up of the paper, Superintendent Thompson should have the chief credit.

The multiplicity of office duties has prevented any extensive work outside of College, although frequent invitations to give public addresses and lectures are received; these are almost uniformly declined, for lack of time. I have presented before the State Sanitary Convention at Topeka an address upon "Some Strains to Health in Student Life," and before the State Teachers' Association a paper upon "Censorship of College Journalism," prepared by request of the Executive Committee of that association.

I shared in three of the Farmers' Institutes during the winter, in each giving an address upon farm matters as connected with education, under the title of "The Farm a Machine." No further public efforts have been made, but I have prepared, by request of the officers in charge, two papers to be presented at the forthcoming meeting of the National Educational Association at San Francisco, one upon "Agricultural Schools, their Objects, Methods, and Equipments," and one upon "Limitations in Manual Training."

During the summer vacation I enjoyed the pleasure of a visit to the Agricultural College of our neighboring State of Colorado.

EXPERIMENT STATION.—The act of Congress making the appropriation for carrying out all the requirements of the so-called "Hatch Act" was passed early in February, and immediate steps were taken for the organization of the station. That organization makes me Chairman of the Council, under whose control all the property and the work of the station are placed. This Council has held weekly meetings during the remainder of the year, and has made considerable progress in equipping the station. The particulars of this work are naturally included in a separate report provided for by the act of Congress referred to.

The expenditures of my department, including general reports and improvements, have been extensive. An annual statement shows the following:

TOTAL EXPENDITURES FOR THE YEAR.

Appropriation vouchers	$1,000 00	
Income fund "	7,214 93	
Department bills	7,822 48	
Total		$16,037 41
These are classified as follows:		
OFFICES.		
Postage, all departments	$236 80	
Stationery	52 41	
Furniture	4 40	
Labor, clerical	170 00	$463 61
CARE OF BUILDINGS, HEATING, ETC.		
Janitor's wages	$896 80	
Students' wages	712 23	
Fuel	3,049 94	
Lights	110 02	
Tools and sundries	96 05	4,865 04
BUILDINGS.		
Repairs	$1,230 15	
Improvements	8,268 32	9,498 47
GROUND.		
Care about buildings		13 45
GENERAL CLASS-ROOMS.		
Furniture	$43 97	
Incidentals	200 95	244 92
SUNDRIES.		
Advertising and Industrialist	$233 75	
Farmers' Institutes	191 69	
Annual catalogue (7,000)	313 40	
Commencement and address	94 75	
Expenses of Board meetings	55 50	
Expenses State Board of Education	23 33	
Expenses Experiment Station Convention	30 00	
Abstract real-estate transfer	9 50	
Grand total		$16,037 41
RECEIPTS.		
From rent	$18 17	
From sales of coal, etc	265 91	
From department transfers	1,594 79	
From all sources have amounted to		$1,878 87
Increase of inventory		7,105 12
Actual expense		7,053 42

In conclusion, I may allude to the general prosperity of the institution and its growing repute, both at home and abroad. The people of the State show their appreciation of the effort made here to meet the wants of those who are to follow industrial pursuits, and throughout the country this College is referred to as one of the few attaining marked success in meeting the requirements of the people and securing their general patronage.

Respectfully submitted. GEO. T. FAIRCHILD, *President.*

FARM DEPARTMENT, 1887–88.

To the Board of Regents of the Kansas State Agricultural College—GENTLEMEN: I present herewith the annual report of the Farm Department for the year ending June 30, 1888, including an outline of duties devolving upon me as a Director and Professor of Agriculture in the Experiment Station.

I have during the year had charge of College classes as follows:

A class of nineteen (19) young men of the fourth-year class in advanced agriculture during the fall term; a class of sixty-three young men of the second-year class in agriculture during the winter term; and during the entire year the third-year class, fifty-seven strong, in rhetoricals. The fourth-year class in U. S. Constitution, which during each spring term since 1884 has been in my charge, was this year assigned by the Faculty to Lieutenant Morrison. This relief is given me on account of the increasing demands upon my time by the newly-created Experiment Station. I have also, in farm work, or the "Farm Industrial," had in the fall term one-half of the young men of the third-year class, and in the spring term one-half of the young men in the second-year class, with a few irregular students in both classes.

In this industrial, the practice from the first has been to divide each class into two equal divisions, assigning one to the farm and the other to the Horticultural Department, where they worked until the middle of the College term, when the division changed places. This arrangement has always been far from satisfactory to those interested. The half-term allows the student to become acquainted with the operations of that season only, in a superficial way, while much of common farm work, by reason of his transfer to the other department, he misses entirely. The large increase of the work of the farm sure to be made necessary by the Experiment Station, would seem to make it possible to greatly enlarge our industrial labor system, thus enabling us to work each class undivided, in one department or the other, throughout the entire year.

In the farm industrial, the thought has been to give to the work throughout the air and reality of business farming. Thorough work and honest labor have been insisted on by the teacher and cheerfully given by the student. As serving to illustrate the business aim of this industrial, attention is called to the work actually performed by the two classes as follows: A close barnyard fence 700 feet in length, with extra-deep-set posts and three large gates; laying the floor of the experimental piggery with broken stone and grout; building forty rods of board-and-wire fence; hauling to the field and spreading 250 two-horse loads of manure; preparing the ground for, and planting thirty acres of corn, and planting and tending a great variety of corn and miscellaneous forage crops, sorghum, etc.

I am clearly of the opinion that the teacher's duty begins and ends "at home" at the school with which his name is associated. His main work is to instruct the youth, and all other "outside work" attending farmers' institutes, lecturing, writing for the newspapers, &c., should be made subordinate to this chief occupation. Nevertheless, the Professor of Agriculture has an important duty to perform in connection with the public gatherings of farmers, for here he may often to best advantage publish the results of his labor at the College. In harmony with the practice of previous years, I have during the past fall and winter taken part in four of the eight farmers' institutes participated in by the College, besides taking part in a number of other farmers' meetings of different names.

By action of the Board, taken February 8, the Professor of Agriculture was made *ex officio* Director of the Experiment Station, and definite duties assigned, among which may be mentioned, keeping the records of all meetings of the Station Council, maintaining the general correspondence of the station, publishing and distributing all reports and bulletins under the direction of the Council, certifying to all bills and acting as General Superintendent in executing the plans of the Council. Three bulletins have so far been issued: Bulletin No. 1, of which an edition of seven thousand copies has been distributed, giving an account of the organization and plans of the station; Bulletin No. 2, relating to the experience of fourteen years with the cultivation of grasses and clover at the College farm, of which nine thousand copies were printed; and Bulletin No. 3, on "Observations on two Insect Pests," issued by the Department of Horticulture and Entomology. Of the last mentioned an edition of seven thousand copies has been printed, which is now in process of distribution. The work of distributing bulletins, the general correspondence of the station and keeping its records have made no inconsiderable addition to my duties.

THE FARM.—The College farm has not escaped the disasters which have universally overtaken the farms of this section of the State, and, to a large degree, the agriculture of the entire West. To the drouth, which set in early in the season and remained unbroken until late in the summer, were added the ravages of insects, particularly chinch-bugs, to an extent unknown before in the history of the College farm. Moreover, the severe winter of 1885–6, taken in connection with the feeble growth of winter wheat made the preceding fall, completely destroyed that crop long before the approach of spring. In this way every one of the staple crops of the farm, except oats, was brought to naught. The twenty-five acres of corn, which, up to July 1, was full of promise, gave only a small crop of fodder and a few bushels of "nubbins." Nine acres of fodder and ensilage corn were literally destroyed by the chinch-bugs. Twelve acres seeded to tame grasses gave a stand so imperfect as to necessitate reseeding. The oat crop did much better, twenty-five acres giving an average yield of eighteen bushels per acre. The hay crop, with the exception of early-sown millet, was less than a half-crop. It is seen from this that the labors of the farm have during the past year been almost entirely non-productive, necessitating the purchase, at very large prices, of nearly all grain and hay used by the herds. This fact, taken in connection with the ruinously low prices of nearly all stock sold, and the reduced valuation in the inventory, suffices to explain the large adverse balance shown in the farm accounts of the year.

Certain miscellaneous and experimental crops, on the other hand, did remarkably well, showing a wonderful capacity for withstanding drouth and insects' attacks. Two acres of sorghum of the Early Amber variety gave a yield in half-dried ensilage material, of nineteen tons. A little more than one-half ($\frac{54}{100}$) acre of kohl rabi gave two hundred and five (205) bushels of superior bulbs, single specimens weighing six to eight pounds each being quite common. These bulbs kept perfectly in the pit until late in the following spring, and were greedily eaten by all classes of stock.

The appropriation of five hundred dollars, made by the Legislature for "experiment, fencing and apparatus," has been expended under the direction of the Board as follows: In experimental work, detailed hereafter, in the construction of a substantial wooden bridge over the otherwise impassable slough which bisects the north half of the farm; in building a new and substantial close board fence, seven hundred feet, about the barnyards, and a board-and-wire fence, forty rods in length, on the west side of the field A; in the purchase of a manure speader, and in the construction of a half-dozen farm gates. The bridge above referred to was made throughout by students under Superintendent Hood's supervision. It is thirty-four feet long, exclusive of approaches, and twelve feet wide, and is every way a well-made, substantial structure.

STOCK.—The College herd of neat cattle now consists of forty-eight head, divided among the different breeds as follows: Shorthorns, twenty-eight; Jerseys, fourteen; Aberdeen-Angus, four; and Hereford two. The pair of Galloways, for some time owned by the College, have been sold. The heifer had proved hopelessly barren, and as it was not thought best to replace her, the bull was sold. Several additions have been made to the herd by purchase. In January I purchased of I. Baor & Lewes, Davenport, Iowa, the yearling Shorthorn bull "Scottish Chief," 89,317, a Shorthorn of pure "Cruickshank" lineage, and an individual of great excellence. I have also purchased for the Experiment Station a pair — male and female — of year-old Herefords. These were obtained from the well-known herd of Mr. Geo. Fowler, of Maple Hill, Kansas, and have given great satisfaction.

The herd of swine remains substantially as it was a year ago. Two breeds — Berkshires and Poland-Chinas — are now kept, and of these there are about thirty Berkshires and eight Poland-Chinas.

Of work horses there are now upon the farm two teams, which, with a saddle pony, is the total of horse stock. The span of mules purchased in 1873 have in recent years failed rapidly. Their disabilities grew to such an extent, that, early in the season, it became necessary to dispose of them. Their places have been taken by a span of heavy five-year-old geldings, purchased in the interest of the Experiment Station.

EXPERIMENTS.— The passage of the Hatch Experiment Station act of Congress, approved by the President March 2, 1877, gave promise of so large an increase of means and opportunities for experimental work that it seemed best to defer experimental operations until the appropriations, sure to be made at an early date, should be available to give effect to the provisions of the law. However, experiments were undertaken in the culture of wheat, some fifty varieties having been sown, with varieties of corn and forage plants, about forty sorts, and with ensilage, and methods of preparing dry fodders. The wheat, corn and forage plants succumbed to the very unfavorable season, except African millet, and the kohl rabi and sorghum above referred to. Results obtained with ensilage, the fodders, and kohl rabi have been fully reported in the *Industrialist* and in published reports of the Secretary of the State Board of Agriculture.

The establishment of an experiment station at the College by act of the Board in February last, and the ample provisions made by Congress for its maintenance, have made possible a great enlargement of the scope of original experimental work in the department. I can only here make brief reference to matters upon which work is in progress: wheat, varieties and treatment; corn, forty varieties, and methods of planting and cultivation; varieties of sorghum for sugar and forage, about fifty varieties; methods of preserving manure; the preparation of ensilage and the construction of the silo; the influence of different foods in the production of milk, cream and butter; experiments in the growth of calves and pigs; pig-feeding experiments. A full report of these experimental undertakings will appear in the station bulletins, issued from time to time, and in the annual reports of the station issued about February 1st of each year.

MACHINES AND IMPLEMENTS.—Very considerable and important additions have been made to the machinery of the farm since my last report was made. For the most part these additions have been made in the interest of the Experiment Station; a few, however, were made at the expense of the general farm. Following I give a list of the new purchases, omitting only small and unimportant implements like hoes and spades:

A hand-made steel boiler of fifteen horse power, and fittings.

Walter A. Wood five-foot-cut mower, manufactured by the Walter A. Wood Reaping and Mowing Machine Co., Hoosick Falls, N. Y.

Columbus manure spreader, manufactured by the Newark Machine Co., Columbus, Ohio.

Four-inch-tire Caldwell wagon, manufactured at Leavenworth, Kas.

Steel-beam Moline clipper plow.

Elevator (22 ft.) for "13 A" Ross feed cutter, manufactured by E. W. Ross & Co.. Springfield, Ohio.

Planet Jr. drill.

Planet Jr. cultivator.

J. I. Case two-wheel lister and drill, manufactured by J. I. Case Plow Works, Racine, Wis.

Double-action root-cutter, manufactured by Belle City Mfg. Co., Racine, Wis.

Tower surface cultivator, manufactured by J. D. Tower & Bro., Mendota, Ill.

Cherry test churn, manufactured by J. G. Cherry, Cedar Rapids, Iowa.

Buckeye No. 2 drill, manufactured by P. P. Mast & Co., Springfield, Ohio.

Iron lever harrow, manufactured by Daley Mfg. Co., DeKalb, Ill.

Considerable scientific apparatus, chief among which are a hot-bed thermometer, milk-testing apparatus, and a small gasoline stove, have been secured; also a small amount of office furniture — an office desk and three office chairs.

With the new boiler aforementioned, steam connections have been made with the large tank in the loft of the experimental barn, for the purpose of heating stock-water. From the tank again pipes distribute water to the barn-yard, the experimental piggery, and to different parts of the barn, and the farm office.

In regard to the above machinery, it is not thought best to attempt to give in detail the merits and demerits of each article, for the reason that most have been in use upon the farm but a few weeks, and often have scarcely seen service of any kind. I therefore give here only the performances of the few of our more recent purchases which have been thoroughly tested. The Columbus manure-spreader has been in use something over a year, and has not nearly given satisfaction. At first it worked fairly well, upon light straw manure, but with heavy, wet dung it has always failed, and the failure was more pronounced as the machinery became worn.

The No. 13-A Ross feed-cutter has done service steadily during two seasons. It has proved a strong, durable machine, not likely to get out of order, even with hard usage, and equally well suited for cutting ensilage or dry fodder.

The Walter A. Wood mower (five-foot cut) has given better satisfaction than any mower heretofore used on the College farm. The absence of side-draft, lightness of draft, strength, and its excellent work are its noticeable features.

The Tower surface cultivator is a comparatively new device for cultivating corn superficially, thus sparing the corn roots. Its numerous sharp, blade-like "shovels" accomplish this purpose well, but whether the new method gives results superior to those obtained by the old cultivator, remains to be seen.

By the reason of the national appropriation for the Experimental Station, the needs of the department for the coming year seem likely to be fully met, so far as all current matters to which the station funds may legally be applied are concerned. There still exists, however, a pressing need for a comfortable farm house, located convenient to the farm buildings, and this want, I may add, may only be supplied by action of the Legislature.

The year has brought to me, as shown above to some extent, a very large addition of work and responsibility in various directions. I have been, however, very fortunate in having in William Shelton, appointed foreman of the farm in February, 1887. and Henry M. Cottrell, recently appointed assistant in farm experiments, most zealous, intelligent and efficient assistants. Experience, too, has taught us the value of our students' services, both in ordinary labors and in positions of greater responsibility.

Below is given the financial statement of the College farm, exclusive of the Experiment Station. The statement of the accounts of the Experiment Station, as a whole and the several departments thereof, is to be given, as provided by law, in the annual report of the station, made "on or before the first day of February" of each year.

FINANCIAL STATEMENT.

	Dr.	*Cr.*
To valuation, June 30, 1887	$24,233 85	
To vouchers approved and department bills	4,200 44	
By valuation, June 30, 1888		$24,011 75
By amount received for labor and in sales of stock and produce		1,717 72
By amount expended in experiments not mentioned		84 78
By balance		2,620 04
Totals	$28,434 29	$28,434 29

Respectfully submitted. E. M. SHELTON,

Professor of Agriculture, and Director and Agriculturist of the Experiment Station.

CHEMICAL DEPARTMENT, 1887–88.

To the Honorable Board of Regents of State Agricultural College—GENTLEMEN: During the year ending June 30, 1888, the work in the Chemical Department has been as follows:

TEACHING.—In the fall term, five classes: two, the usual class-room recitations in inorganic chemistry, with experiments showing the facts and elucidating the principles taken up in the lessons, these classes numbered thirty-five and forty-three: two classes, composed of the same students, and meeting twice per week for practice. This "practice," as the repetition of the experimental work by the student is called, has been extended for the classes, so that instead of putting in an hour per week as previous classes have done, they have had two hours per week. There has been a marked improvement in the practice work as well as in the general result. This has been due, in the first place, to the doubling of the time at our disposal, and second to the course over which the students have been taken. A new text-book, by Prof. Ira Remsen, has been used during the last year. In this book the facts and the principles of an elementary course in chemistry are so logically presented and demonstrated by such well-selected experiments that the student finds that an easy and entertaining study, which as often presented is but a collection of dry and loosely-connected facts and experiments selected solely for their brilliancy. A class of twenty-five, meeting once a week, in second-year rhetoricals, makes the fifth class of the term.

In the winter term, two classes in organic chemistry, six weeks, thirty-three and forty members; two classes, six weeks in mineralogy, thirty-two and thirty-eight; two classes, six weeks in blowpiping, forty and thirty-one; the third-year class in agricultural chemistry, thirty-nine members.

At the middle of the winter term I was relieved from teaching the class in second-year rhetoricals.

Spring term, the second-year class in analytical chemistry, two hours daily. This class numbered 67. Mr. Breese, who began this work as assistant in chemistry on September 1, 1887, (Mr. Willard having resigned to continue his chemical studies at Johns Hopkins University), had personal charge of one of the classes in blowpiping, assisted with the other classes, and faithfully performed his portion of all the work of the department.

Mr. E. F. Nichols, a fourth-year student, assisted with the practice classes and with the blowpiping.

Of analytical work there have been, besides the determination of numerous minerals, ores, &c., the quantitative analysis of the following: Mineral water, one sample; baking powder, two; potable waters, two; salt, one; alcohol in liquors, four; brine, one; limestone, one; natural gas, one.

The analysis of rainwaters for ammonia, nitrates and nitrites has been continued through the year. This work has now been carried on for twenty-eight months. The results are of considerable interest, and will be published in the report of the Experiment Station.

The organization of the Experiment Station has called for my energies as chemist in preparation for extensive work during the summer. Mr. J. T. Willard will take the position of assistant in experiments on July 1st.

I have had my part in the chapel lectures, the editorial work on the *Industrialist*, the farmers' institutes, and other general work of the Faculty. A detailed account of the expenditures of the department will be shown by the books of the Secretary and Treasurer.

Respectfully submitted. G. H. FAILYER.

HORTICULTURAL DEPARTMENT, 1887–88.

To the Board of Regents: I beg leave to submit the following report upon the work done in the Department of Horticulture and Entomology during the year ending June 30, 1888.

In the class-room the work has remained substantially as given in my last report, and no detailed description is here needed. The following summary shows the classes regularly or temporarily under my charge:

Studies.	*Young men.*	*Young women.*	*Total.*
FALL TERM.			
Horticulture (two divisions)	53	18	71
Horticulture, industrial	25	....	25
Rhetorical work	18	9	27
WINTER TERM.			
United States History (two divisions)	64	41	105
Rhetorical work	18	7	25
SPRING TERM.			
Entomology (two divisions)	48	17	65
Horticulture, industrial	22	....	22
Horticulture, greenhouse work	....	1	1

The lawns have demanded constantly increasing care, through their extension and through more particular culture. Reseeding has been necessary in several places, and some resodding in the exposed portions of the terrace and road-borders in front of the main building, and the margins of walks and roads about other buildings. Additions of considerable extent have been made to the various groups and belts of ornamental trees and shrubs, the more important being the planting of about seven hundred European larch among the small trees in the large groups set last year south of the main building; of five hundred oaks, including white oak, pin oak and chestnut oak, in wide groups in the same locality and along the south line of the grounds; of two large groups and many individual specimens of leguminous trees and shrubs along the east line; of about one hundred maples and allied trees of various sorts, in the large central group south of the main drive-way; of ash and related trees and shrubs, near the College buildings; and of various ornamentals, in groups or singly, about the dwellings on the grounds. Material for these plantings was found in our nursery rows, excepting that the European larch and the oaks, with a few evergreens, were purchased for this purpose. The plantations above specified are all in the nature of permanent additions to the illustrative or experimental growth upon the grounds, those previously growing in the places mentioned having been set mostly as a preparation for the present permanent plantations.

Few additions have been made to the lists of sorts growing in the orchard, the principal being the planting in vacant rows of the old vineyard upon the gravelly hill east of the south apple orchard, of one tree each of twenty-two varieties of apple, dwarfed upon Paradise stocks, and of pears two each of thirty-four varieties on quince stocks. A few standard trees of varieties of the apple not now fruiting with us have been placed to fill vacancies in the north orchard.

With the object of testing more definitely the value of the process of spraying orchard trees with arsenical poisons as a prevention of the attacks of the larvæ of the codlin moth, as well as to compare different combinations of these poisons, the north orchard, including about two hundred and seventy bearing trees of over a dozen sorts, was made the field of a series of trials, with eleven different combinations. Through the middle of the orchard an average row of Winesap trees was left unsprayed, for comparison with adjoining rows of the same variety, poisoned, the subsequent treatment being the same for all the trees. Observations begun include the effect of the particular application upon the foliage, the record of fallen apples with the proportion of sound and infested fruit, and the record of insects captured under the paper bands, which were placed upon the trees soon after the spraying, and are examined weekly. These observations will be carefully made during the entire season and the details reported through the Experiment Station. The remaining orchard upon the College grounds and the orchard upon the upper farm were sprayed with a single mixture, one ounce of London purple to eight gallons of water, the sole object being the protection of the fruit from the attacks of the first brood of larvæ. In these orchards the observations are not extended, owing to a lack in time and assistance to carry them out in the same detail here as in the orchard subject to special experiment.

In accordance with your permission, I have begun the planting of a new vineyard in better soil than that occupied by the present plantation of bearing vines, by setting two vines each of fifty-one varieties, strong one and two-year vines having been purchased. This new vineyard will occupy the hill-slope east of the south orchard, and it is proposed to plant here vines of all varieties of the grape that can be made to live in this locality.

To other plantations of the small fruits the only additions have been those of two plants each of seven varieties of the currant and one gooseberry new to our list, and a few others to fill vacancies.

The work in the vegetable garden has been done wholly in the line of preparation for comparative trials of varieties of several vegetables. The planting this year includes potatoes, tomatoes, beans and peas. In each of these classes we have a large number of sorts growing, and are recording at length all facts observed that have a bearing upon the question of their general value and adaptability. Of the potatoes, one hundred and sixty varieties were purchased of E. E. Stine of Ohio; sixty-one varieties were planted from selected sorts grown by this department, some of them for several years, and the remainder, eleven sorts, were donations to the department from several firms or individuals. Among those of our own growing a few were selected tubers grown from seed sent out several years since by the U. S. Department of Agriculture as "Pringle's hybridized seed." Several of these are varieties of some promise. Of tomatoes there were planted eighty-three distinct lots, each a separate sort, or if a duplicate, from a different seedsman. Of peas, in the same manner were planted one hundred and forty, and of beans one hundred and sixty-six distinct numbered lots. This series of trials is undertaken as a part of the work of this department under the Experiment Station.

The comfortable office building, provided by your liberality, is ready for occupation, and promises to be well adapted to its purpose as office and laboratory. Apparatus, authorized by you, has been ordered, and the portions not needing to be imported are received. The propagating house is well toward completion, and the heating apparatus, a Hitchings No. 17 corrugated boiler, is at hand and ready for setting. This house, planned to give a range in winter from a cool green-house to a hot-house temperature, and allowing a wide range of culture or propagation, cannot but appear as a most useful addition to the facilities for horticultural experiment.

Up to the time of the organization of the Experiment Station the position of foreman in the department was filled by Mr. C. L. Marlatt, a graduate and M. S. of this College. With the rearrangement consequent upon the establishment of the station, Mr. Marlatt became assistant in Entomology, and the position of foreman and assistant in Horticulture was accepted by Mr. S. C. Mason, also a former student of this institution. The green-house has remained in the care of Mr. William Baxter, and a considerable portion of the lawn work has also fallen to his share. I should fail in doing justice to these assistants if the opportunity should pass without my acknowledgment of the satisfactory character of their service.

I desire specially at this time to call attention to the urgent need for better accommodations for the team and tools of the department. The present stable building has for several years been insufficient, and has furnished but partial and inconvenient shelter. The plows, cultivators and other tools must now be stored wherever room can be found for them — some of them in the green-house potting-room, others in the basement to Horticultural Hall, and some of the larger implements must remain, perforce, out of doors. I desire permission to submit for your consideration, a plan and estimates for a suitable building, combining tool-rooms, work-room, and storage for hay and grain, with space for the stabling of the department teams.

Following is the financial statement:

EXPENDITURES.		
Cash paid out on vouchers		$2,760 42
Charged as follows:		
Grounds	$283 78	
Orchards	578 83	
Greenhouse	367 21	
Tools	114 96	
Museum	541 83	
Office	180 90	
Team	152 91	
Department transfers		75 24
Total		$2,835 66
RECEIPTS.		
Cash receipts		$965 64
Department transfers		18 05
Increase in inventory		821 32
Total		$1,805 01

Respectfully submitted. E. A. POPENOE.

BOTANICAL DEPARTMENT, 1887–88.

To the Board of Regents—GENTLEMEN: The classes taught each term, and the number of students in each, are shown in the following tabulation

FALL TERM.	
Elementary Botany	32
Physiology	46
Special Botany	1
Rhetoricals	23
WINTER TERM.	
Zoölogy	29
Structural Botany	22
Industrials	1
Rhetoricals	20
SPRING TERM.	
Elementary Botany	99
Industrial	1

In the spring term, when the extra work of the Experiment Station began, I was relieved of the classes in geology and rhetorical exercises. The class in elementary botany was divided into three sections, and these were taught at successive hours, thus making three classes instead of one, as would appear from the table.

The addition during the year of four compound microscopes (Hartnack's) improved greatly the equipment necessary for good work in structural botany. The class can now be satisfactorily supplied, each member having. the use of a separate microscope as well as a tray of tools and set of reagents. The windows of the north laboratories, as changed, give better light than before, yet they are not wholly satisfactory. The insertion of double windows, as now contemplated, will doubtless furnish the requisite light. The temporary shelf-tables must necessarily be removed while making the repairs referred to, and I would recommend that larger, substantial and permanent tables be made to replace them.

Lithological collections have been made at various points for the purpose of building a column in the museum that will represent the several geological formations in Kansas in consecutive order. No materials from the formations in the western portion of the State, however, have yet been obtained. But all that is necessary to complete the column will be collected during the early part of the coming year, when the material can be put into the shape contemplated.

Another important addition to the collections, serving both for exhibition and for reference in connection with class-work in botany, is a Kansas herbarium. The specimens are mounted on sheets in the usual manner, and the representatives of each species are included in a species cover, similar to that in general use for a *genus cover*. The arrangement of orders and genera is the same as that in the general herbarium, (Bentham and Hooker's genera plantarum,) but the species are arranged alphabetically. There have been mounted and placed in this herbarium 1,322 specimens, representing about 618 species. These were collected in forty-three different counties. The collecting so far has been done mostly by myself, but the assistance of others, especially of students, will be greater hereafter. The work can be pushed rapidly forward, and it is hoped that every county will soon be represented. The collection should illustrate the distribution of our entire native flora.

The zoölogical portion of the museum has been increased only by minor collections made in the vicinity. The cases in the museum not being finished, no display has yet been made of the material that has rapidly been accumulating during the last two years; but it is hoped that everything can be placed on exhibition during the coming year.

The addition of the botanical work of the Experiment Station necessitated the transfer of the collections as well as classes — except the botanical — to the Department of Physiology and Veterinary Science. This enabled me, with the help of the assistant in botany, to undertake special studies in weeds, of fertilization of corn, and of various diseases of plants, a full account of which will be given in the annual report of the Experiment Station.

The financial account is shown in the following tabulation:

EXPENDITURES.	
Class supplies	$15 75
Apparatus	196 51
Museum specimens, purchase and collecting	109 10
Freight, drayage, etc	26 84
Student labor	34 07
Department bills—Executive department (postage)	1 00
Farm department (stock)	225 00
Printing labels and stationery	31 25
Mechanical department (labor)	5 85
" " (museum and store-room)	1,154 18
Total	$1,799 55
CREDIT BY DEPARTMENT BILLS.	
Mechanical Department (paint and brush)	$1 85
Chemical Department (alcohol)	2 00
Physiology and Veterinary Science (cases and collections)	4,013 70
Total	$4,017 55

Respectfully submitted. W. A. KELLERMAN.

MATHEMATICAL DEPARTMENT, 1887–88.

To the Board of Regents—GENTLEMEN: The classes under my charge during the year ending June 30, 1888, were as follows:

TERMS.	*Number enrolled.*
Fall Term.	
Algebra (two divisions)	73
Trigonometry and surveying (two divisions)	46
Winter Term.	
Geometry (two divisions)	64
Algebra	52
Arithmetic	52
Spring Term.	
Geometry (two divisions, five weeks each)	56
Algebra (two divisions)	97

While I am enabled to report a continued improvement in the ability and advancement of classes reporting to me for instruction, there is still a great lack of thorough training in the elementary forms of mathematical reasoning. This lack of preparatory drill, added to the fact that the review of arithmetic during the first term in this College must be done in a hasty manner, leaves the pupil poorly prepared to complete the study of algebra in two terms. Important algebraic discussions must be omitted, and, even then, the percentage of failures in this study is large, while of those who pass it only the strongest students are fully equipped for the mathematics of the third year. We are waiting with expectation for the time when commercial arithmetic and book-keeping can be finished in the fall term of the first year, and thus three terms may be secured for algebra.

The transfer of the classes in trigonometry to my department, brought with it increased responsibility and many more hours of labor in connection with the practice-work of surveying. These classes did the usual amount of this work, including a careful survey of the College farm, preparatory to making a topographic map of it during the winter term. The necessity for dividing this survey among so many students, gave but little chance for each of them to secure practice at a large range of work. Smaller surveys, with greater variety of practice, more platting, and closer supervision over all, are desirable reforms, and plans are being matured to bring them about in the work of another year.

My entire vacation and many afternoons and Saturdays have been devoted to work in connection with my duties as Chairman of the Committee on Library.

Respectfully submitted. D. E. LANTZ,
Professor of Mathematics.

THE LIBRARY, 1887–88.

To the Board of Regents—GENTLEMEN: As chairman of the Committee on Library, I have the honor to submit the following report of the Library for the year ending June 30, 1888.

A steady growth of the various departments of literature represented in the Library has continued. The State appropriation of $1,000, although much too small for our needs, has enabled us, while securing a part of the more valuable of current publications, to complete some of our sets of periodicals, and to take advantage of some special bargains offered by second-hand dealers. The Library has now complete or nearly complete, sets of the Atlantic Monthly, Harper's Magazine, Scribner's and Century Magazine, Edinburgh Review, Popular Science Monthly, The Nation, Literary World, Science, Journal of the Royal Agricultural Society, The Garden, American Agriculturist, Journal of the American Chemical Society, Journal of the Military Service Institution, Canadian Entomologist, Gardener's Monthly, and some others. Arrangements have also been made by which we shall secure complete sets of the Gardener's Chronicle and the North American Review. It is needless to say that these bound periodicals constitute a most useful part of the library. The State appropriation was all used in the purchase of books and periodicals. In purchasing the latter, care was taken to include only such as, when bound, would be of permanent value in the library.

With about the same enrollment of students as in the preceding year, the total number of books drawn from the Library was 7,563 as compared with 5,994 for the previous year. This is an average of about 20 for each person using the Library. This, however, does not represent the total use of the Library, as the students and others use the books freely, at all hours of the day. The card catalogue and index and Poole's Index enable them to do this with but little help from the Assistant Librarian. The reading room is also in almost constant use.

The following is a statement of the character of the books drawn during the year. The figures represent the number of volumes:

Bound magazines	592
History	670
Biography	451
Travels	282
Fiction	1,657
Poetry	307
Literary topics	447
Essays	534
Religious	115
Education	84
Art	81
Household	78
Elocution	235
Political	181
Juveniles	261
Unclassified	226
Total, history and literature	6,200

Agriculture	171
Horticulture	83
Botany	46
Zoölogy	124
Chemistry	43
Physics	154
Mechanics	98
Physiology	174
Geology	27
Military Science	43
Mathematics	62
General Science	338
Total science	1,363
Grand total	7,563

The inventory of June 30, 1888, shows the following books in possession of the Library:

7,453 bound volumes, valued at	$12,013 04
352 duplicate volumes, valued at	89 00
2,490 pamphlets, valued at	70 00
Total value of books	$12,172 04

This is an increase during the year in the value of books of $1,813.53, due to the following sources:

Value of books purchased during the year	$1,039 03
Value of periodicals bound during the year	452 85
Value of donations received	191 55
Increase due to rebinding old volumes	130 10
Total	$1,813 53

Against the first item, outstanding bills to the amount of $112.90 remain unpaid, and are to be met from the appropriation due July 1, 1888.

The increase in the number of bound volumes in the Library was from the following sources: By purchase, 557 volumes; by binding, 167 volumes; by donations, 126 volumes; by exchange, 45 volumes. Losses, 4 volumes. Total increase, 881 volumes.

The prediction made a year ago as to the rapid reduction of our remaining shelf-room is being fulfilled. Several of the alcoves are already full, and an immediate addition to one of the cases is absolutely necessary to keep up our classification. The need of more room and a better arrangement of cases is continually felt. The coming year will fill all our shelves.

The following financial statement will show the expenditures and their relations to the inventory June 30, 1888:

Inventory June 30, 1887:		
Books and pamphlets	$10,358 15	
Furniture	519 91	
Catalogue	1,179 63	
Other items	159 77	
		$12,217 46
Losses:		
Books	$4 50	
Furniture	1 00	5 50
Balance	....	$12,211 96
Increase for the year:		
Value of books bought	$1,039 03	
Value of periodicals bound	452 85	
Value of books donated	191 55	
Increase by rebinding, etc	134 50	
Catalogue (labor)	353 25	
Permanent supplies (cards)	40 00	
Book shelves	12 00	2,310 38
Inventory June 30, 1888	....	$14,522 34
Expenditures:		
From State appropriation—For books	$814 80	
From same—For magazines	185 20	
From current funds—For books	16 70	
Periodicals	16 35	
Pay-roll, catalogue	353 25	
Pay-roll, labor and attendance	467 60	
Freight and express	35 10	
Supplies	45 55	
Total cash expenditures	$1,934 55	
Department transfers	121 40	2,055 95
Credits:		
Cash paid to Treasurer	12 12	
Department transfers	184 60	
Inventory increase	2,304 88	2,501 60

Very respectfully,
D. E. LANTZ,
Chairman of Committee.

DONATIONS.

The following are the principal donations received during the year ending June 30, 1888:

From Miss Susan B. Anthony.—The History of Woman Suffrage, vols. 2 and 3.

From Hon. John A. Anderson.—Official Records, War of the Rebellion, vol. 18, vol. 19, part 1; vol. 19, part 2; vol. 20, part 1; vol. 20, part 2; vol. 21; Patent Office Gazette, as issued; Consular Reports, as issued; Report of Chief of Engineers, 1886, 3 vols., 1887, 4 vols.; Report of Comptroller of Currency, 1887, parts 1 and 2; Report of Secretary of the Treasury, 1887; Report of Commissioner of Navigation, 1885, 1886; Report of Commissioner of Labor, 1886. Publications of the U. S. Geological Survey—Monographs, vols. 2 to 12; Atlases, vols. to 2, 3, and 12; Mineral Resources, 4 vols.; Bulletins, 5 vols. Army Register, 1885–87; Report of Chief of Ordnance, 1887; Report of the Inter-State Commerce Commission.

From E. B. Baldwin, Illinois.—The Eastern Continent, vol. 1.

From Hon. N. J. Colman, Washington, D. C.—U. S. Agricultural Report, 1885, 1886; U. S. Entomological Commission, 4th Report; Report on Forestry in Europe; Bulletins, as issued.

From President Fairchild.—Proceedings of National Educational Association, 1887; Proceedings of National Council of Education; School Laws of Kansas.

From Hon. A. P. Forsythe, Independence, Kansas.—Nautical Almanac, for 1884.

From Hon. Charles Garfield, Michigan.—Michigan Horticultural Report, for 1887; History of Michigan Horticulture.

From I. D. Graham, Manhattan.—Aliso and Acne; Mistakes of Ingersoll.

From H. S. Roberts, Manhattan.—The Nation, 20 vols., unbound.

From F. J. Rogers, Manhattan.—Report on Cattle Diseases, Maine, 1887.

From Dr. S. W. Williston, New Haven, Conn.—Synopsis of N. A. Syrphidæ; Connecticut Board of Health, tenth report; Health Bulletins, New Haven.

From the Secretary of the Interior.—Congressional Globe, third session Thirty-seventh Congress, part 2 and appendix; Congressional Record, first session Forty-fourth Congress, parts 6 and 7; Congressional Record, third session Forty-fifth Congress, part 3 and appendix; United States Geological Survey, fourth and fifth annual reports; Commerce and Navigation, reports 1882, 1883, 1884, 1885, 1886; Reports of Secretary of the Interior, Public Lands, 1882–83; same, Indian Affairs, 1882–83; same, vol. 2, 1885; Messages and Documents War Department, 8 vols.; Senate and House Journals, Forty-ninth Congress, 5 vols.

From the Chief Signal Officer, Washington, D. C.—Instructions to Observers in Signal Service of United States; Report for 1886.

From the Commissioner of Education.—Report for 1885–86; Art and Industry, part 1, Drawing in the Public Schools; The Study of History in American Colleges; Circulars of Information as Issued; Mexico in 1876.

From the United States Civil Service Commission.—First, Second and Third Annual Reports.

From Prof. E. M. Shelton, Manhattan.—Consular Reports on Cattle and Dairy Farming.

From Secretary of the Smithsonian Institution.—Smithsonian Miscellaneous Collections, vols. 28, 29 and 30.

From Various State Officers and Secretaries.—Laws of Kansas, 1887; Proceedings of Kansas Academy of Science, vol. 10; Report of Kansas Railroad Commissioners, 1887; Report of Michigan Board of Agriculture, 1887; Transactions of Massachusetts Horticultural Society, 1885 and 1886; Report of Illinois State Industrial University, 1886; Report of Wisconsin Agricultural Experiment Station, 1886; Wisconsin Farmers' Institutes, 1887; California State Board of Horticulture, 1885–86; American Museum of Natural History, New York Reports and Bulletins; Pennsylvania State College Report, 1886; North Carolina Experiment Station Report, 1886; Kansas Board of Health, third report.

The following periodicals have been on file in the library and reading-room during the year:

I.—PURCHASED FROM LIBRARY APPROPRIATION.

MONTHLY.

Agricultural Science.
American Chemical Journal.
American Meteorological Journal.
American Journal of Science and Arts.
American Naturalist.
Atlantic Monthly.
Art Journal.
Bibliographer and Reference List.
Botanical Gazette.
Canadian Entomologist.
Carpentry and Building.
Century Magazine.
Eclectic Magazine.
Education.
Entomologica Americana.
Forum.
Gardener's Monthly.
Harper's Monthly.
Inland Printer.
Journal of the Chemical Society.
Magazine of American History.
North American Review.
Paper and Press.
Popular Gardening.
Popular Science Monthly.
Railroad and Engineering Journal.

WEEKLY.

American Architect (gelatine edition).
Chemical News.
Country Gentleman.
Critic.
Electrical Review.
Garden.
Gardener's Chronicle.
Inland Architect (photogravure edition).
London Live-Stock Journal.
Nature.
Rural New Yorker.
Science.
Scientific American.
Scientific American Supplement.

SEMI-MONTHLY.

Literary World.

BI-MONTHLY.

Studies from the Biological Laboratory.

QUARTERLY.

Journal of the Military Service Institution.
American Art Printer.
Journal of Comparative Medicine and Surgery.
The Auk.

II.—BOUGHT FROM CURRENT FUNDS.

Butterick's Delineator.
Good Housekeeping.
Harper's Bazar.
Harper's Weekly.
The Household.
The Nation.
The Season.

III.—DONATED TO THE LIBRARY.

Abilene Daily Gazette.
Advance, Chicago.
American Missionary.
Breeders' Gazette, Chicago.
Christian Cynosure.
Illinois School Journal.
Industrialist.
Kansas City Live-Stock Indicator.
Topeka Daily Capital.
Wilson County Citizen.
McPherson Democrat.

IV.—INDUSTRIALIST EXCHANGES.

(*a*) FROM KANSAS.

Abilene—Weekly Gazette.
Allen—Allen Tidings.
Alma—Alma Enterprise.
Wabaunsee County News.
Alta Vista—Alta Vista Register.
Anthony—Anthony Republican.
Appomattox—Commercial.
Argentine—Argentine Advocate.
Argonia—Clipper.
Arkalon—Arkalon News.
Arkansas City—Weekly Republican Traveler.
Arlington—Arlington Enterprise.
Ashland—Ashland Weekly Journal.
Republican.
Assaria—Assaria Argus.
Atchison—Atchison Champion.
Atchison Times.
Atwood—Republican Citizen.
Barnes—Barnes Enterprise.
Baxter Springs—Baxter Springs News.
Bluff City—Bluff City News.
Bunker Hill—Bunker Hill Gazette.
Burden—Burden Enterprise.
Burdett—Burdett Bugle.
Burlington—Burlington Independent.
Burlington Nonpareil.
Burlington Republican-Patriot.
Burr Oak—Burr Oak Herald.
Burrton—Burrton Graphic.
Caldwell—Caldwell Journal.
Canton—Canton Carrier.
Carbondale—Carbondalian.
Cawker City—Cawker City Record.
Cedarville—Cedarville Globe.
Celia—Celia Enterprise.
Chapman—Chapman Carrier.
Chase—Chase Record.
Cherryvale—Cherryvale Republican.
Cimmarron—Cimarron New West Echo.
Clay Center—Dispatch.
Times.
Clearwater—Clearwater Sun.
Clifton—Clifton Local News.
Clifton Review.
Clyde—Clyde Herald.
Coldwater—Coldwater Enterprise.
Comanche City—Comanche News.
Concordia—Concordia Empire.
Kansas Blade.
Kansas Critic.
The Daylight.
Cottonwood Falls—Chase County Courant.
Council Grove—Council Grove Republican.
Anti-Monopolist.
Crisfield—Crisfield Courier.
Cunningham—Cunningham Herald.
Delphos—Delphos Carrier.
Dodge City—Dodge City Times.
Globe Live-Stock Journal.
Dorrance—Dorrance Nuggett.
Douglass—Douglass Tribune.
Downs—Downs Times.

Edmond—Edmond Times.
El Dorado—El Dorado Republican.
Ellinwood—Ellinwood Advocate.
Ellsworth—Ellsworth Democrat.
Emporia—Kansas Workman.
Englewood—Englewood Chief.
Eskridge—Eskridge Star & Home Weekly.
Eureka—Herald.
Fall River—Fall River Courant.
The Times.
Frankfort—Frankfort Sentinel.
Fredonia—Fredonia Democrat.
Wilson County Citizen.
Fontana—Fontana News.
Fulton—Fulton Independent.
Gaylord—Gaylord Herald.
Glasco—Glasco Sun.
Grainfield—Grainfield Cap-Sheaf.
Greenleaf—Greenleaf Journal.
Greensburgh—Greensburgh Rustler.
Kiowa County Times.
The Republican.
Gridley—Gridley Gazette.
Gove City—Gove City Gazette.
Gypsum City—Gypsum Valley Echo.
Halstead—Halstead Independent.
Halstead Herald.
Hanover—Hanover Democrat.
Harlan—Harlan Enterprise.
Harper—Harper Sentinel.
Hartford—Hartford Call.
Hays City—Hays City Sentinel.
Hazelton—Hazelton Express.
Hepler—Hepler Banner.
Herington—Herington Tribune.
Hiawatha—Hiawatha World.
Hillsboro—Hillsboro Herald.
Holton—Recorder.
Holton Signal.
Howard—Howard Courant.
Democrat.
Humboldt—Humboldt Union.
Hutchinson—Hutchinson Weekly News.
Independence—Southern Kansas Tribune.
Iola—Iola Courant.
Jamestown—The Kansan.
Jewell City—Jewell County Republican.
Junction City—Junction City Republican.
Junction City Tribune.
Junction City Union.
Kansas City—Kansas Pioneer.
Daily Drovers' Telegram.
Kansas City Gazette.
Kendall—Kendall Boomer.
Kinsley—Kinsley Banner-Graphic.
Kirwin—Kirwin Independent.
LaCygne—LaCygne Weekly Journal.
Lake City—Lake City Bee.
Lakin—Kearney County Advocate.
Lawrence—Lawrence Tribune.
Leavenworth—Daily Times.
Daily Evening Standard.
Kansas Catholic.
Lecompton—College Echoes.
Leonardville—Leonardville Monitor.
Leoti—Leoti Standard.
Leroy—Leroy Reporter.
Liberal—Liberal Leader.
Seward County Democrat.
Lincoln—Lincoln Beacon.
Lincoln Democrat.
Lindsborg—Lindsborg News.
Framat.
Logan—Logan Republican.
Long Island—The Inter-Ocean.
Longton—Longton Times.
Louisville—Louisville Indicator.
Madison—Madison News.
Manhattan—Daily Republic.
Mercury.
Nationalist.
Republic.
Telephone.
Mankato—Kansas Labor Clarion.
McPherson—McPherson Anzeiger.
McPherson Democrat.
McPherson Republican.
Marquette—Marquette Monitor.
Marysville—Marshall County Democrat.
Marshall County News.
True Republican.
Meade Center—Meade Republican.
Meade County Press-Democrat.
Medicine Lodge—Democrat.
Millbrook—Millbrook Democrat.
Graham County Times.
Minneapolis—Minneapolis Messenger.
Montezuma—Montezuma Chief.
Moran—Moran Herald.
Moundridge—Moundridge Leader.
Mulvane—Mulvane Record.
Muscotah—Muscotah Record.
Nescatunga—Nescatunga Enterprise.
Netawaka—Netawaka Reporter.
Nickerson—Nickerson Argosy.
Nickerson Register.
Norcatur—Norcatur Register.
Norton—Norton Champion.
Norton Courier.
Norton New Era.
Oberlin—Oberlin Eye.
Oberlin Herald.
Oberlin Farmer.
Olathe—Kansas Patron.
Osage City—Kansas People.
Osborne—Osborne County Farmer.
Osborne Journal.
Osborne County News.
Oswego—Labette County Democrat.
Oswego Independent.
Ottawa—Ottawa Herald.
Ottawa Journal.
Paola—Paola Times.
Peabody—Peabody Gazette.
Phillipsburgh—Phillipsburgh Herald.
Pleasanton—Pleasanton Herald.
Protection—The Leader.
Quinter—Settlers' Guide.

Ravanna—Ravanna Chieftain.
Ravanna Record.
Reid City—Greeley County Republican.
Richfield—Leader Democrat.
Russell—Russell Record.
Russell Journal.
St. Marys—St. Marys Star.
Salem—Salem Argus.
Sabetha—Nemaha County Republican.
Salina—Salina Herald.
Journal.
Rising Sun.
Western Odd Fellow.
Santa Fé—Santa Fé Monitor.
Scandia—Scandia Independent.
Scandia Journal.
Sedan—Sedan Times-Journal.
Severy—Severy Record.
Sharon Springs—Sharon Springs Leader.
Soldier City—Soldier City Tribune.
Solomon City—Solomon Sentinel.
Speareville—Speareville Blade.
Spring Hill—Spring Hill New Era.
Sterling—Sterling Bulletin.
Sterling Gazette.
Saturday Republican.
Strong City—Chase County Republican.
Thayer—Headlight.
Topeka—Daily Capital.
Daily Commonwealth.
Kansas Farmer.
Kansas Methodist-Chautauqua.
Knight and Soldier.
Weekly Capital and Farmers' Journal.
Western Baptist.
Troy—Troy Times.
Turon—Turon Rustler.
Ulysses—Ulysses Tribune.
Grant County Register.
Valley Centre—Valley Centre News.
Valley Falls—Valley Falls New Era.
Varck—Western Friend.
Wakeeney—Western Kansas World.
Trego County Republican.
Wakefield—Wakefield Advertiser.
Wallace—Wallace County Register.
Wamego—Kansas Agriculturist.
Wamego Reporter.
Washington—Washington Register.
Washington Post.
Washington Republican.
Waterville—Waterville Telegraph.
Wellington—Sumner County Standard.
Wetmore—Nemaha County Spectator.
Westphalia—Westphalia Times.
Westplains—Westplains Rustler.
Whiting—Whiting Weekly News.
White City—White City News.
Wichita—Commercial.
Kansas Globe.
Eagle.
Wilson—Wilson Echo.
Wilson Hawkeye.
Windom—Windom Enterprise.
Winfield—Winfield Courier.
Winfield Weekly Visitor.
Wyandotte—Agassiz Companion.

(*b*) FROM OTHER STATES.

American Agriculturist—New York.
American Farmer—Baltimore.
American Sheep-Breeder.
American Swineherd.
Cadet, The.
Chaddock Monthly.
Christian Herald.
Colman's Rural World.
Dairy World—Chicago.
Delaware Farm and Home—Wilmington.
Educational News—Philadelphia.
Farm and Fireside.
Farm and Home.
Farmers' Review.
Farm, Field, and Stockman.
Farm, Stock, and Home.
Good Cheer.
Hesperian—Lincoln.
Housewife.
Husbandman—Elmira, N. Y.
Home Weekly—Xenia, O.
Independent—New York.
Kansas City Commercial.
Kansas City Implement and Farm Journal.
Kansas City Live-Stock Indicator.
Kansas City Live-Stock Record.
Ladies' Home Companion.
Maryland Farmer and New Home.
National Educator.
Nebraska Farmer—Lincoln.
New York Tribune.
New England Farmer—Boston.
Prairie Farmer—Chicago.
St. Louis Grocer.
Scribner's Magazine.
Southern Cultivator and Dixie Farmer.
Southern Live-Stock Journal—Starkville, Miss.
The Southwest—Fort Worth, Texas.
Tariff League Bulletin.
Traveller's Record.
True Educator.
Valley Spirit—Chambersburg, Pa.
Western Farmer.
Western Resources.
Weekly Press—Philadelphia.

DEPARTMENT OF INDUSTRIAL ART AND DESIGNING, 1887–88.

To the Board of Regents of the Kansas State Agricultural College—GENTLEMEN: I have the honor to submit herewith a report upon the work done in the Department of Industrial Art and Designing for the school year 1887–88.

The several branches taught, as well as the number of students in each branch, are shown in the following table:

TERMS.	MECHANICAL DRAWING.				FREEHAND DRAWING.		TOTALS.
	First year.	*Second year.*	*Third year..*	*Special......*	*Primary....*	*Advanced...*	
Fall	169	....	....	3	6	22	200
Winter	30	....	....	10	164 *	3	207
Spring	....	56 *	33 *	7	11	5	112
Totals	199	56	33	20	181	30	519

* Of these classes, the first (36) was divided into two sections, each working half a term; the second (33) worked on Monday and Friday, and the third (164) on Monday, Wednesday and Friday of each week.

I also assisted the third-year class during the winter term in the drawing, coloring and lettering of their landscape maps of the College farm, the surveying for which had been done by the class during the fall term. This work was done afternoons and Saturdays.

For methods of instruction followed and text-books used, I refer you to my last report. The only material change made was in the work of the first-year class in mechanical drawing, where I added a series of graded exercises in geometrical surface designing, and conventional representation of building materials, work which involved the use of the drawing-board, square, triangle, brush, India ink and water colors. Tuesday and Thursday of each week were given to these exercises.

Considering the large classes of the department, the results of the departure were very gratifying to me in every respect. Three days of each week the class worked, as heretofore, from the text-books. Prof. Morse's Course, Books I. and II., being out of print, I introduced Prang's Geometric Problems, and supplemented it by dictating about thirty constructions of regular curves, together with the simple practical applications. The problems and figures were drawn and studied at home, while the class-hours were devoted to blackboard recitations, and to the discussion of the mathematical and ornamental principles involved.

Specimens of the finished work by the several classes, and especially by the students of advanced free-hand drawing, and of special work in mechanical drawing, were on exhibition in my class-room during commencement, and were undoubtedly seen by you. The exhibition contained upward of 1,200 plates, and drew many favorable comments from visiting parents and teachers.

In addition to my work of instruction I have shared in the general work of the Faculty, have prepared a weekly column of Kansas Educational Notes for the *Industrialist*, and have taken part in a number of educational meetings and Farmers' Institutes. In the summer of 1887 I attended the sessions of the National Educational Association at Chicago as Secretary of the Industrial Section. During the fall and winter I took active part in the Farmers' Institutes at Seneca, Wakeeney, and Manhattan, attended the State Teachers' Institute at Topeka, lectured before the county teachers' institutes at Junction City and Zeandale, addressed the Farmers' Club at Wabaunsee, and read several papers before the Manhattan Horticultural Society, of which I have been the President.

In the summer of 1887 I prepared the plans and specifications for the enlargement of the College chapel, and in the spring of 1888 I performed the duties of architect and building superintendent in the erection of the horticultural laboratory of the Experiment Station.

The department is greatly in need of new furniture. Most of the tables now in the room never answered our purpose well, as they were originally built for the Department of Mineralogy and Geology, and were transferred to the Industrial Art Department to make room for specimen cases in the laboratory. They are old now, and should be replaced with suitable desks which would permit the students to draw, standing or sitting, according to the character of the work. There should also be provided a number of cabinets with lock drawers for the safe keeping of papers, pencils, drawing tools, brushes, water colors, etc. The large number of students in the department make some arrangement for the safe storage of individual property a pressing necessity. The probable cost of these much-needed equipments will be between $500 and $600, and I respectfully request that an appropriation of this amount be made by the Board or secured from the Legislature.

The Industrial Art Department is in good working order. The students manifest a good degree of enthusiasm in all the branches of the art; especially has this been the case last year in regard to the third-year class in the study of perspective. I can also report an increased interest among the more advanced students in standard works on history of art, principles of design, and the nature and function of art.

Repectfully submitted. J. D. WALTERS,
Professor of Industrial Art and Designing.

DEPARTMENT OF TELEGRAPHY AND BOOK-KEEPING, 1887–88.

To the Board of Regents—GENTLEMEN: I herewith hand you a brief report of the work in my charge during the year ended June 30, 1888.

As your Assistant Secretary, my special responsibility has been for the proper keeping of the financial records of the College. With this work you are familiar through your constant and careful inspection of these records at your various meetings held during the year, and no further report of it is here deemed necessary. A summary of the financial records will appear in the report of your Secretary.

During the year the payment of the students and men not named on the regular monthly pay-roll of employés has been in my hands. Each department of the College employing students or other labor by the hour is required to present a monthly pay-roll, showing the name of the payee, the rates per hour agreed upon in a monthly meeting of the superintendents, and the amount due. The department pay-rolls thus made are brought together in one general pay-roll, from which, by special arrangement with the College Treasurer, these employés are paid in this office. In this manner I have paid out during the year for student labor, at the rates varying with the value of the service rendered and the amount of responsibility incurred, from 5 cents to 12½ cents per hour, $3,766.65. For journeyman labor, employed only where greater skill and more constant service is required, at rates varying from 12½c. to 25c. per hour, $1,960.37. Total, $5,727.02. These pay-rolls have averaged $477.25 per month for the entire year, or $497.62 per month for the school year; the rates being lower for the intermittent service necessarily given during term-time than those paid for the more continuous service of vacation-time. These amounts represent a total of 27,581¼ hours of student labor and 8,712 hours of journeyman labor for the year.

With the perfection of the organization of the Experiment Station as a department of the College came a considerable increase in the work of this office. A system of book-keeping similar in general purpose to that used during the past nine years for the College accounts was opened, and now makes a comprehensive showing of the financial condition of the station at all times. The duplicate vouchers used were so planned as to show, not only the distribution of expenditures between the several departments represented in the station, but also between the several titles under which these expenditures are classified. Results will be shown in the report of the Experiment Station.

As Secretary of the Faculty my work remains as in former years, except the increase in quantity which comes with the growth of the College and the added details which follow increased experience. The page allotted to each student in the Students' Register is intended to contain everything vital to his history as a student during his entire course here.

As instructor in Book-keeping and Commercial Law I have to report the enrollment of a total of 186 students in these studies, as shown in the following table:

Terms.	*Ladies.......*	*Gentlemen...*	*Totals.........*
Fall (1 division)	15	5	20
Winter (2 divisions)	96	52	148
Spring (1 division)	6	12	18
Totals	117	69	186

This is an increase of thirteen over the enrollment of last year in the same classes. The work of these classes has, in general, been very satisfactory, though the proper instruction of this number of students in a study which has so much written work as book-keeping, makes a very considerable addition to my own labor. The business of the office requires my presence and attention during the whole of each week-day, and no time is left for the inspection of the five hundred or more written exercises of the week, the grading of examination papers and the preparation of future work for the class of 150 students of the winter term.

This work, and that of preparing papers and lectures for use elsewhere, has always been done by my own lamp-light and after the close of the office for the day.

As Superintendent of Telegraphy, I will report the enrollment in that department of sixty-seven students, of whom seven were ladies and sixty gentlemen.

Extending the table of attendance presented in my last report, the enrollment of the past year compares with that of previous years as here shown:

Years.	*Ladies.......*	*Gentlemen...*	*Totals.........*
1879–80	18	41	59
1880–81	29	46	75
1881–82	24	54	78
1882–83	26	56	82
1883–84	18	49	67
1884–85	8	42	50
1885–86	6	48	54
1886–87	7	54	61
1887–88	7	60	67
Totals	143	450	593

The receipts and expenditures of the Telegraph Department during the year are here given:

DEBITS.		
Student labor	$88 30	
Type-writer supplies	3 60	
Battery materials	25 95	
Freight and drayage	14 40	
Tacks, nails, lag-screws and copper	3 00	
Telephone rental	40 00	
Refunded fees	3 50	
Line materials	12 11	
Electric bells	3 29	
Instruments and fixtures	49 54	
Remodeling type-writer	40 00	
Replaced tools	4 53	
Wash bowl for office	2 20	
		$290 42
Department bills	$59 48	
Inventory decrease	24 65	84 13
Total debits		$374 55
CREDITS.		
Cash received as fees	$247 65	
Cash for old instruments	4 50	
Bills against appropriations	20 96	
Department bills	87 20	
Total credits		$360 31
Balance		14 24

The following table shows the receipts and expenditures during the nine years the department has been in my charge:

Years.	*Expenditures**	*Receipts **	*Balances*	*Inventory*
1879–80	$117 87	$123 50	$5 63	$257 25
1880–81	325 24	200 24	125 00	382 25
1881–82	330 07	291 45	38 62	643 50
1882–83	277 04	311 75	34 71	691 85
1883–84	507 38	248 52	258 86	894 67
1884–85	299 85	192 75	107 10	889 50
1885–86	283 47	286 80	2 33	974 85
1886–87	236 46	223 25	13 21	950 19
1887–88	349 90	360 31	10 41	925 54
Totals	$2,727 28	$2,238 57		
Balance, expense		488 71		

* Increase or decrease in inventory is not included here.

In compliance with an action of the Board of one year ago, I have the assistance of Mr. J. G. Harbord, Assistant Librarian, in the work of teaching in this department, and to his skill as an operator, coupled with his knowledge of applied electricity and his skill in teaching, must be credited the results of the work of the year in instruction in this department.

My other work has remained much the same as heretofore. The various standing committees of the Faculty to which I have been appointed have each claimed their share of work. That of the Committee on Examinations and Grades has been of especial importance in its determination of the qualifications of candidates for admission to the various classes, and of the weaker students to continue in the work to which they have been assigned.

By special arrangement I represented the College in an exchange of two bulls from the College herd for a series of mounted Kansas mammals, effected with Mr. A. B. Baker, County Superintendent of Trego county. This necessitated a trip to Wakeeney in March last.

Besides doing a full share of the editorial work of the *Industrialist*, my contributions to its local and other pages have been somewhat more frequent than formerly. In order to give the third-year class in rhetoricals opportunity for further drill in public rhetorical exercises, and because of having done double duty in lecturing before the students last year, I gave place to this class in the adopted scheme of public exercises for the year, thus postponing the lecture assigned to me until after vacation.

I attended the Farmers' Institute, held at Lakin in December, as a representative of the College. I also attended the annual meeting of the Kansas Academy of Science, and was reëlected its Treasurer and member of its Executive Committee. It was also my privilege to attend the meetings of the Consolidated Cattle Growers' Association held in Kansas City, in November, and while there I enjoyed, through the kindly influence of Prof. Shelton, all the privileges accorded to delegates. I attended the annual gathering of the State Teachers' Association during a part of its session, the meeting of the State Board of Agriculture during its entire session, and the Kansas Dairy Association, which I helped to organize in February last.

In June I served as a member of a locating commission for the Northwest Kansas Christian College Association, whose duties required a personal visit to four competing towns in the counties of Smith, Phillips, and Norton.

I have also held the offices, during the year, of President of the College Scientific Club — a most useful adjunct to our course of study — and of Vice-President of the Manhattan Horticultural Society, whose meetings are held at the College.

My duties, though continuous throughout the entire year, have been of the pleasantest through my relations to my fellow-workers and to the members of the Board whose hearty approval of work well done has been a most powerful incentive to renewed exertion.

Respectfully submitted. I. D. GRAHAM,
Ass't Sec'y of Board, Sec'y of Faculty, Instructor in Bookkeeping and Commercial Law, and Sup't of Telegraphy.

DEPARTMENT OF ENGLISH, 1887–88.

To the Board of Regents — GENTLEMEN: I respectfully submit the following report of my work in the Department of English and History for the year ending June 30, 1888.

I have had charge of four classes daily during the year, with a fifth class once each week, the rhetoricals of the fourth year. In the fall term I had the third-year class in General History, and the first-year class in English in three divisions. In the winter term the third-year class in rhetoric, and the first-year in English structure. In the spring term the third-year class in English literature and the first-year in composition. The rhetoricals of the first-year class were placed in my charge and were conducted in connection with the English work, declamation and composition being the special features of the recitation on each Wednesday.

As stated above, I have also had the fourth-year class in rhetoricals. Besides section work this class has alternated with the third-year class in presenting original orations from the chapel platform during the public hour of the College.

Following will be found the number and distribution of students in my department:

Class.	*Young men.*	*Young women.*	*Total.*
FALL TERM.			
General History, third year	24	17	41
English Grammar, first year (3 classes)	103	62	165
Rhetoricals, first year (once each week)	103	62	165
Rhetoricals, fourth year (once each week)	20	7	27
WINTER TERM.			
Principles of Rhetoric, third year	30	15	45
English Structure, first year	93	60	153
Rhetoricals, first year	93	60	153
Rhetoricals, fourth year	19	7	26
SPRING TERM.			
English Literature, third year	18	12	30
Composition, first year (3 classes)	73	60	133
Rhetoricals, first year	73	60	133
Rhetoricals, fourth year	18	7	25

The work in my department remains substantially the same as in my last report. The first and the third-year students have studies in my department throughout the year. The first-year classes review grammar in the fall term, and give especial attention to the structure of the English sentence and to the various transpositions of its elements. In the winter term they study the history, formation, and meaning of English words; in the spring term, the principles and practice of composition. The English course of the first year is a practical drill in the easy and correct use of the language.

The work of this year in U. S. history, which comes in the winter term, has been done in other departments, as my hours were all filled.

The third-year class used Swinton's Outlines of History as a text-book in the fall term. The work of the class was largely text-book study, because of the limited time, but the attempt was made to have it lead to increased use of the library and into many new fields of thought.

In the winter term this class used Hill's Principles of Rhetoric as a text-book in studying the relations of the principles of rhetoric to the accurate, forcible, and elegant expression of thought. The work of the spring term was such study of the history, character and amount of English literature as can be made in ten weeks, together with class-reading and discussion of typical works of each period.

In addition to regular college work, I attended a Farmers' Institute at Great Bend and one at Lakin.

Respectfully submitted. O. E. OLIN,
Professor of English and History.

DEPARTMENT OF HOUSEHOLD ECONOMY, 1887–88.

To the Board of Regents—GENTLEMEN: During the past year my work has been as follows:

In the fall term I taught my usual class of fourth-year young ladies in English literature, spending much of the time on the writings of the authors of the present, while not forgetting those of the past. Criticism and comparison occupied many days. The class numbered seven, and was pleasant and profitable to all.

I also taught two classes in arithmetic, one consisting of first-year students, the most of whom readily finished the subject during the term; the other was the class of "B" students, who were studying arithmetic.

During the winter term my class in household economy numbered sixteen, and did most satisfactory work in all directions. The class was smaller than usual and it gave an opportunity for more personal work. In addition to the usual Monday dinner and Friday lunch, an additional lunch was given on Wednesdays. This was limited in numbers, but gave to a few students who were unable to go home at midday an opportunity to have a cup of hot coffee and a simple lunch at ten cents each. The usual teas and party were prepared and enjoyed, while the class tried new recipes and planned meals, as well as made plans for model kitchens, and wrote essays on the scientific value of foods and the reasons for certain combinations in cooking.

The spring term found the class in dairying numbering sixteen. Through the liberality of the Board a very comfortable little dairy had been provided, and the butter-making was much more satisfactory than ever before. The fact that we have not a supply of cold water in the dairy occasions some difficulty, but the completion of the water-works system will overcome that trouble before another spring term.

The class made two hundred and thirty-eight pounds of good butter; went through the processes of making cheese and cottage cheese; and listened to several hours of lectures on methods used in the best dairies. All of the butter except twenty pounds reserved for experimental purposes was sold at an average price of 20c. per pound.

The following summary will show the direction of expenditures during the year:

FINANCIAL STATEMENT.

DEBITS.		
Ice, 1887, delayed bill	$8 85	
Materials for cooking	152 07	
New equipment	64 50	
Dairy (Mechanical Department)	57 80	
Student labor	20 38	
Ice	5 45	
Milk (Farm Department)	72 85	
Paper (Printing Department)	1 30	
Repairs	4 25	
Express	5 47	
Total	$392 92	
CREDITS.		
Cash, lunches and dinners		$133 85
Cash, butter		43 60
Increase of inventory		118 65
Washing (student labor)		15 00
Total		$311 15
Balance, expense		81 77

In addition to my class in dairying, the spring term brought me a class of sixteen young ladies in special hygiene. They each wrote five essays upon the subjects given them in regard to the preservation of health, and took daily lessons upon hygienic subjects. A "B" class in English was also a part of my spring work.

During the whole year I have had one division of the second-year class in rhetoricals, requiring of each an essay, a declamation or an oration each week.

My turn· has come regularly in outside college work. The lecture in chapel, the work on the *Industrialist*, and the work at Farmers' Institutes, has all come, each kind in its turn. As the institution has grown, this department has increased in every way. The work of the past year has been very enjoyable and satisfactory.

Respectfully submitted. NELLIE S. KEDZIE,
Professor of Household Economy and Hygiene.

SEWING DEPARTMENT, 1887-88.

To the Board of Regents—GENTLEMEN: The following report of work done in the Sewing Department during the year ending June 6, 1888, is respectfully submitted.

The classes have been larger than ever before, five classes each year during the entire College year.

ENROLLMENT.

Fall term	94
Winter term	84
Spring term	74

The number of dresses made during the year was 175, besides about 600 miscellaneous articles, including sewing, knitting hoods, scarfs and mittens, and some fancy work.

The students are first taught plain hand-sewing. Much time is spent in the practice upon button-holes, and the use of the machine, and as they become more competent they are allowed to cut and plan their own work.

Many learn to cut and fit dresses and to plan the various parts of a dress. All try to cultivate taste in all directions, and to make the best of what they have in reach.

Most of the time the young ladies furnish their own material and work for themselves, making almost all their clothing for the school year.

Most of the ladies of the fourth-year class made their dresses for graduation, as did also most of those that took part in the third-year exhibition for that occasion.

The following will show somewhat the line of expenditure for this department during the last year:

DEBIT.		
Materials	$58 29	
Department bills	8 15	
		$66 44
CREDIT.		
By cash	$7 30	
Inventory increase	37 50	
		44 30
Balance expense		$22 14

This sum represents the actual cost of the department in the way of incidental expenses.

The Board has kindly provided us with six good machines, cutting-tables, and all that is necessary for doing good work.

Respectfully submitted.

ELIDA E. WINCHIP,
Superintendent of Sewing.

MECHANICAL DEPARTMENT, 1887–88.

To the Board of Regents—GENTLEMEN: I have the honor of presenting the following report of the Mechanical Department and of the Mechanics and Engineering. During the year the shop has been greatly changed in equipment and facilities for handling the large classes which seem necessary. The machinery which was purchased last June was erected in the north half of the lower floor. New benches were designed and arranged in the south half, and the number increased so that 44 students can be accommodated each hour. The total enrollment of the three terms was 379, with 227 different students. The enrollment of the blacksmith shop was 7. The new arrangement adds greatly to the efficiency of the instruction as well as to the capacity of the shop.

The work has been in the same direction as that of last year, the plan being extended and arranged to take advantage of our new machinery, and to furnish systematic instruction by drawings to the higher as well as the lower classes.

Besides the primary course in wood-work, which is laid out for beginners, the second-year class have wood turning in the winter. The third-years also have turning and machine work besides the general advanced wood-work. The fourth-year class has general construction and machine work. The increased interest taken by all the classes in the work during the year was a satisfactory direct result of the increased facilities and means of illustration. Mr. G. N. Thompson, a graduate of '87, was employed as foreman, and rendered efficient assistance. During the year the work of the department was greatly increased and a large share of the energies of the department were demanded on work outside of the instruction in the department itself. During July, after the machinery had been purchased and set, work was commenced in the shop on the various jobs that were laid out for the department. Three large rooms in the attic of the main building were partitioned off, inclosing 266 feet of space, and were finished. The large boilers used for heating the main building were re-set on an improved plan. About 22,000 brick were laid and 526 hours' labor employed. The inside blinds purchased for 160 windows of the main building were mostly hung and finished in hard oil. Each window required 8 folds and 24 butts; 1,100 hours' labor was required on them. Working drawings of the general museum cases were made and the cases were begun in September.

The six cases were built of walnut and ash, and contain 24 large lights of double-strength glass 43x76 inches and 12 of plate glass 36x76; 2,470 hours of journeyman labor was required, and 360 hours of student labor. The six cases cost $1,483.10. They inclose 1,680 cubic feet of space.

In February two cabinet cases for entomological specimens were made, requiring 540 hours' labor. Also, the cases for the physics and engineering apparatus were designed and built between February and June. These were built of oak, and contain 48 lights of glass 24x40 inches and eight 36x40. The cases cost $500, requiring 1,142 hours' journeyman labor and 363 hours' student labor for their completion.

Twenty-five breeding-cases were built for the entomological work, requiring 391 hours' labor.

The cases for mineralogical specimens were designed and built. There are ten cases all alike, built of oak; 1,038 hours of labor were spent on them. These cost $50 each.

A fifteen-horse-power boiler for the Farm Department was placed in position and the setting and connections completed. The three new propagating pits, each 11x70 feet, requiring nearly 2,500 square feet of glass, were put up, entirely by the department.

The hot-water heating system, consisting of boiler and about 1,000 feet of 4-inch pipe, was also put in by the department; 1,615 hours of labor were employed to finish the pits.

The foregoing work includes only the larger jobs which have been unusual in the shop heretofore. Many tables and desks of special design have been required of the department also. All this work, including the general run of repairs and building of small items, has furnished employment during the year for journeymen to the amount of 9,426 hours, and for students 4,989 hours. This is added to the labor of the shop foreman and of Mr. Gundaker, the engineer and blacksmith, whose time is under the direction of the department.

The heating apparatus and the engine of the mechanical building were transferred from the Executive Department, and the heating of this building and of the natural history building was intrusted to the department.

These, with the additional duties of two classes in mechanics in the winter term and one in engineering in the spring term, have been items which have called largely for time and thought away from the contemplated lines of improvement in the department itself.

The financial statement is as follows:

EXPENDITURES.	
Appropriation	$500 00
Current expenses	6,968 15
Department transfers	1,656 74
Total	$9,124 89
RECEIPTS.	
Cash	$4,472 48
Department bills	1,090 27
Inventory increase	1,740 14
Cash on hand	104 82
Bills receivable	606 50
Total	$8,014 21
Balance	1,111 68

Of this balance of expense about $300 has been spent for assistance in the instruction in the shop and blacksmith shop. The larger items of the remainder are included in the bill of lumber for student work; the cost of running the machinery for students' use, clearing up the shop each day, and incidental expenses of the blacksmith shop, including coal, iron and files. The practice of charging all work of the department at the exact cost of the labor and materials renders it quite possible for the department to be a constant loser, when the amount of work is as great as it has been the past year. This occurs from the increase in many items of expense not chargeable directly to the work in hand, and of so variable a character as to make it impossible to properly apportion the expense. The deficit also covers an an amount probably due to that cause.

Two classes in mechanics were taught by me during the winter term. The classes included thirty gentlemen and seventeen ladies. The subject can hardly be presented in the usual manner, owing to the fact that analytic geometry and calculus, generally taken in preparation for mechanics, are not studied by our students. The subject has been treated during the last year from the side of applied as well as theoretical mechanics; and an effort made to show the wide range of applied mathematics to all things mechanical.

The short course forbids going beyond an understanding of a few of the more common mechanical principles, and a familiarity with practical problems involving them. The simple problems in mechanics as applied to the steam engine were made a feature of last year's work. A collection of models of mechanical movements and various methods of common construction would help greatly in making the study of more practical value, as well as give good training. A similar collection of models, methods of construction and materials is much needed in the study of engineering also.

One class in engineering, numbering twenty gentlemen and two ladies, was taught by me in the spring term. The outlines of Mahan's Civil Engineering was followed, although much of the work was original investigation by the students. Students in couples investigated by actual experiment such subjects as Concrete and Betons, Production of Cement, Adherence of Mortars, Fractures of Cast-Iron, Tensile and Crushing Strength of Woods, Limits of Elasticity, etc. The apparatus for making these experiments is very limited indeed, and an effort was made to stimulate the ingenuity of the student in the manner of his investigation. The object of the eleven weeks' study was to enable the students to read intelligently the general engineering articles, and to appreciate the work of others in that line, as well as to stimulate to original investigation of such matters of engineering practice as could come under their observation.

A course embracing the elements of mechanical as well as civil engineering is suggested for the coming year.

From the fund of physics and engineering apparatus $42.66 has been spent in improvising a testing-machine; $3.80 has been spent for material, etc.

Respectfully submitted. O. P. HOOD,
Superintendent and Instructor.

DEPARTMENT OF MUSIC, 1887–88.

To the Board of Regents—GENTLEMEN: The following report will show the number of pupils enrolled and the work accomplished in the Musical Department:

SCHEDULE OF CLASSES.

	Females.	*Males....*	*Total.....*
FALL TERM, 1887.			
Instrumental music class	26	12	38
Singing class, "B"	34	49	83
Singing class, "A"	32	26	58
Writing class	14	41	55
Orchestra	....	....	12
Totals	106	128	246

SCHEDULE OF CLASSES — CONCLUDED.

	Females.	*Males....*	*Total....*
WINTER TERM, 1888.			
Instrumental music class	18	16	34
Singing class, "B"	22	36	58
Singing class, "A"	9	7	16
Orchestra	....	....	13
Totals	49	59	121
SPRING TERM, 1888.			
Instrumental music class	16	8	24
Singing class, "B"	15	8	23
Singing class, "A"	24	20	44
Writing class, "A"	14	26	40
Writing class, "B"	17	11	28
Orchestra	....	....	23
Totals	86	73	182

In addition to the instruction given in the above classes, chapel services, and other regular duties, the department has furnished music at the following College exercises: The fall-term social and Alpha Beta exhibition; the winter-term social and exhibition of the Webster Society; the spring-term social, the exhibition of the Hamilton Society; on Sunday afternoon with the Baccalaureate sermon, three selections; the Undergraduates' exhibition, five selections, two instrumental and three vocal; the annual address, two selections; and on Commencement Day, six selections, three vocal and three instrumental. Respectfully submitted.

A. B. BROWN,
Professor of Music.

PRINTING DEPARTMENT, 1887–88.

To the Board of Regents — GENTLEMEN: I have the honor to submit the following report for the College year ending June 30, 1888.

The enrollment in printing classes for the year was:

	Gentlemen...	*Ladies.......*	*Totals........*
Fall term	44	13	57
Winter term	63	13	76
Spring term	27	8	35

The tasks assigned the advanced students were more difficult than any before introduced into the department, and that they acquitted themselves creditably the specimens will show. The students were required to design and compose commercial forms of all kinds, in the most of which considerable rule-work was necessary, and many called for tint-blocks to be printed in from three to five colors. The work, both plain and fancy, inclosed in the large frame which I purchased by permission of the Board, is a permanent ornament on the walls of the printing office.

The printing done in the Department during the year consisted of 6,000 copies of the annual catalogue; Bulletins Nos. 1, 2 and 3 for the Experiment Station, in editions of 5,000, 10,000, and 7,500 respectively; 300 copies of a sixteen-page pamphlet containing the last annual address, and the two ten-thousand editions of the *Industrialist* in August and June.

I would respectfully call the attention of the Board to the need of considerable new material, such as an additional job press, larger than the one we have here, a rule-cutting and curving machine, wood-type borders, and additional metal type faces, brass rules and cases.

FINANCIAL STATEMENT.

DEBITS.		
Expense vouchers	$1,821 96	
Department bills	115 59	
Total	$1,937 55	
CREDITS.		
Cash		$1,126 59
Department bills		648 44
Inventory increase		92 97
Total		$1,868 00
Balance expense		69 55

Respectfully submitted.

J. S. C. THOMPSON,
Superintendent of Printing.

MILITARY DEPARTMENT, 1887–88.

MANHATTAN, KANSAS, June 30, 1888.

Board of Regents Kansas State Agricultural College—GENTLEMEN: I have the honor to submit the following report: There were enrolled for drill during the fall term, 118 with an average of three drills per week; winter term, 113 with an average of two drills per week; spring term, 94 with an average of two drills per week.

The drills have included the school of the soldier, company and battalion. Considerable attention was paid to the skirmish drill of the company. Target practice was had during part of the winter term, the ammunition being furnished by the Government.

A course of twenty-six lectures were given to fifty-five students of the second-year class, covering the course laid down in the catalogue of this year.

Sixty new blouses and the same number of forage caps were purchased for the department during the year, at a cost of $250. We had also received from the War Department, for use at the College, fifty additional stands of arms and six N. C. O. swords.

In addition to my military duties, during the fall term I had charge of two sections of the first-year class in arithmetic, and during the winter term one section of same class in United States history. During the spring term I had charge of the fourth-year class in United States Constitution, and, by special arrangement, of a class (part first- and part second-year) in algebra, and the "B" students in arithmetic and geography.

Respectfully submitted.

J. F. Morrison, 2d Lieut. 20th Infantry,
Professor of Military Science and Tactics.

DEPARTMENT OF PHYSICS, 1887–88.

To the Board of Regents—Gentlemen: I have the honor to make the following report for the year ending June 30, 1888.

During the fall term I instructed four classes: one in physics and meteorology, two in arithmetic, and one in English grammar. The class in physics and meteorology, a fourth-year class, devoted the first ten weeks of the term to a study of the subjects of light, electricity and magnetism, the last four weeks being given to the study of meteorology.

During the winter term I had charge of four classes, all in the preparatory department: two classes in arithmetic, one in grammar, and one in geography. During the last half of the term I had charge of the work of one division of the second-year rhetorical class.

In the spring term I instructed one class in physics, one class in grammar, and had charge of three divisions of the second-year rhetorical class. The third-year class in physics gave their attention for the ten weeks to the subject of hydrostatics, pneumatics, sound, and heat. In addition to class instruction, I have taken meteorological observations during the year.

SCHEDULE OF CLASSES.

Studies.	*Young men.*	*Young women.*	*Total.*
FALL TERM.			
(*a*) Arithmetic	35	10	45
Physics and Meteorology	19	7	26
(*b*) Arithmetic	39	23	62
(*b*) English	52	16	68
WINTER TERM.			
(*b*) Arithmetic	22	15	37
Geography	32	19	51
(*b*) English—two divisions	54	31	81
Second-year rhetoricals	14	7	25
SPRING TERM.			
Physics	22	13	35
(*b*) English	13	10	23
Second-year rhetoricals—three divisions	39	13	52

FINANCIAL STATEMENT.

To inventory of apppratus and shelving	$1,857 50	
Appropriation for physical apparatus	500 00	
Appropriation for physical cases	500 00	
Freight and expressage	10 38	
Incidentals	5 00	
Student labor	9 30	
Department bills	23 30	
By inventory of apparatus		$1,610 33
Inventory of physical cases		500 00
Department bills		632 66
Balance		162 49
Totals	$2,905 48	$2,905 48

Respectfully submitted. F. J. Rogers, *Instructor.*

VETERINARY DEPARTMENT.

To the Board of Regents — Gentlemen: The following report covers only the time from May 1, 1888, to June 30, 1888.

At the former date the fourth-year class in geology, numbering twenty-five, were placed in my charge. This class had already received thorough instruction in dynamical geology under Professor Kellerman. In this subject I have tried to follow the general course as laid down in the catalogue, giving special prominence to this State. Next year I think it will be well to give one or more lectures on the relation of geology to health. Sanitation is of great importance in a comparatively new, as well as in the older part of the country. Its geologic relations can well be considered in connection with the study of general geology.

Outside the class-room, my attention has been directed chiefly to the museum. The specimens and preparations in alcohol, as well as the mounted birds, have been removed to the new museum. The jars have been refilled with alcohol when needed, and labels supplied where necessary.

Thanks are due Professor Lantz for the names of a number of Kansas birds. Steps will be taken to procure new jars, as authorized by the Board, so that many specimens may be displayed which hitherto have not been on exhibition on account of lack of room.

Respectfully submitted. R. F. Burleigh,
Professor of Physiology and Veterinary Science.

APPENDIX.

EXPERIMENT STATION.

THE HATCH LAW.

An Act to establish Agricultural Experiment Stations in connection with the colleges established in the several States under the provisions of an act approved July 2d, 1862, and of the acts supplementary thereto.

Section 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established, under direction of the college or colleges, or agricultural department of colleges, in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July 2d, 1862, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designated as an "Agricultural Experiment Station:" *Provided*, That in any State or Territory in which two such colleges have been or may be so established, the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the Legislature of such State or Territory shall otherwise direct.

Sec. 2. That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

Sec. 3. That in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigation or experiments; to indicate from time to time such lines of inquiry as to him shall seem most important; and in general, to furnish such advice and assistance as will best promote the purposes of this act. It shall be the duty of each of said stations, annually, on or before the first day of February, to make to the Governor of the State or Territory in which it is located, a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the Commissioner of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports, and the annual reports of said stations, shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of $15,000 is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each Territory entitled under the provisions of section eight of this act, out of any money in the treasury proceeding from the sales of public lands, to be paid in equal quarterly payments on the first day of January, April, July and October in each year, to the treasurer or other officer duly appointed by the governing boards of said colleges to receive the same, the first payment to be made on the first day of October, 1887: *Provided, however*, That out of the first annual appropriation so received by any station an amount not exceeding one-fifth may be expended in the erection, enlargement, or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per centum of such annual appropriation may be so expended.

SEC. 6. That whenever it shall appear to the Secretary of the Treasury, from the annual statement of receipts and expenditures of any of said stations, that a portion of the preceding annual appropriation remains unexpended, such amount shall be deducted from the next succeeding annual appropriation to such station, in order that the amount of money appropriated to any station shall not exceed the amount actually and necessarily required for its maintenance and support.

SEC. 7. That nothing in this act shall be construed to impair or modify the legal relation existing between any of the said colleges and the government of the States or Territories in which they are respectively located.

SEC. 8. That in States having colleges entitled under this section to the benefits of this act, and having also agricultural experiment stations established by law separate from said colleges, such States shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established, under provisions of said act of July 2d aforesaid, an agricultural department or experimental station in connection with any university, college or institution not distinctively an agricultural college or school, and said States shall have established or shall hereafter establish a separate agricultural college or school which shall have connected therewith an experimental farm or station, the Legislature of such State may apply in whole or in part the appropriation by this act made to such agricultural college or school; and no Legislature shall, by contract express or implied, disable itself from so doing.

SEC. 9. That the grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purposes of said grants: *Provided*, That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of the

Legislature meeting next after the passage of this act shall be made upon the assent of the Governor thereof, duly certified to the Secretary of the Treasury.

SEC. 10. Nothing in this act shall be held or construed as binding the United States to continue any payments from the treasury to any or all the States or institutions mentioned in this act; but Congress may at any time amend, suspend or repeal any or all of the provisions of this act.

Approved March 1, 1887.

As soon as the news came that the President had signed the above bill, the State Legislature passed the following

CONCURRENT RESOLUTION.

Be it resolved by the Senate of the State of Kansas, the House concurring, That the annual appropriation of fifteen thousand dollars ($15,000), made available to the the State of Kansas under the act of Congress for the maintenance of an Experiment Station, for the benefit of agriculture, in connection with each college established under the act of Congress approved July 2d, 1862, be and is hereby placed under the control of the Board of Regents of the Kansas State Agricultural College, subject to rules and regulations expressed or implied in the act of Congress above named.

Approved March 3, 1887.

ORGANIZATION.

The general features of the Station, in its organization and equipment, as settled by the Board of Regents, are here given for the information of the public, for the most part in the exact terms of the minutes of the meeting:

Whereas, The Legislature of the State of Kansas, by resolution dated March 3d, 1887, accepted the provisions of an act of Congress entitled "An act to establish Agricultural Experiment Stations in connection with the colleges established in the several States under the provisions of an act approved July 2d, 1862, and of the acts supplemental thereto," and placed the disposition of the appropriation under the control of the Board of Regents of the Kansas State Agricultural College:

Now, therefore, we, the Board of Regents of the Kansas State Agricultural College, do hereby establish an Agricultural Experiment Station in connection with, and as a part of, the said College, under the following regulations:

1. The general executive management of the Station shall be under the control of a Council, to consist of the President of the College, the Professors of Agriculture, Horticulture and Entomology, Chemistry, Botany, and Veterinary Science, and such other officers of the College as the Board may designate.

2. The President of the College shall be, *ex officio*, Chairman of the Council, and shall have the same supervisory control of the Experiment Station as of other departments of the College.

3. The Professor of Agriculture shall conduct original researches or verify experiments upon the comparative advantages of rotative cropping as pursued under a varying series of crops, together with experiments designed to test the comparative effects of the various manures, natural or artificial, on crops of different kinds; the adaptation and value of different grasses and forage plants; the composition and

digestibility of the different kinds of food for domestic animals, and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable. He shall also be, *ex officio*, Director of the Station, the duties being to keep the records of all meetings, receive and maintain all general correspondence with the Station, attend to the publication and distribution of all reports and bulletins under direction of the Council, certify to all bills, and act as General Superintendent in executing the plans of the Council.

4. It shall be the duty of the Professor of Chemistry to conduct original researches or verify experiments in the chemical composition of useful plants at the different stages of growth; the analysis of soils and waters; the chemical composition of manures, natural or artificial, and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable.

5. The Professor of Horticulture and Entomology shall conduct original researches or verify experiments on the capacity of new plants or trees for acclimation; the diseases to which they are severally subject, and the remedies therefor, together with all questions in economic entomology, and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable.

6. The Professor of Botany shall conduct original researches or verify experiments on the physiology of plants; the diseases to which they are subject, with the remedies for the same; and such other researches and experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable.

7. It shall be the duty of the Professor of Human and Comparative Physiology and Veterinary Science to conduct original researches or verify experiments in the composition and digestibility of the different kinds of food for domestic animals, the diseases to which they are subject, together with their prevention and cure; and such other original researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable.

8. Each member of the Council shall have full control of experiments assigned to his own department, and if any question arises as to the scope of any experiment, or by whom it shall be conducted, the same shall be decided by the Chairman of the Council.

9. Assistants shall be chosen by the heads of departments, subject to ratification by the Council; but the rates of compensation shall be fixed by the Board of Regents.

10. Estimate for equipment of the Station shall be submitted by the Council at each quarterly meeting of the Board of Regents, through the Secretary of the Board.

11. The funds of the Station shall be held strictly to the purposes contemplated in the act of Congress, in a separate account on the books of the Secretary and the Treasurer, with distinct vouchers for all expenditures, which shall be audited and paid as other vouchers for special appropriations.

12. Bulletins may be issued to the public from time to time under the law, as the Council may order, and there shall be printed in each the words: "By order of the Council.—E. M. Shelton, Director;" but the annual report to the Governor shall be made through the Board of Regents.

Supplemental resolutions declare that John E. Hessin, Treasurer of the College, shall receive and disburse the funds of the Station, and that E. M. Shelton, Director of the Station, shall exercise the franking privilege conferred by the act of Congress.

THE STATION COUNCIL.

Pres. GEORGE T. FAIRCHILD, A.M.,
Chairman ex officio.

Prof. EDWARD M. SHELTON, M.S.,
Agriculturist, Director ex officio.

Prof. GEORGE H. FAILYER, M.S.,
Chemist.

Prof. EDWIN A. POPENOE, A.M.,
Horticulturist and Entomologist.

Prof. WILLIAM A. KELLERMAN, Ph.D.,
Botanist.

Prof. ROBERT F. BURLEIGH, D.V.S.,
Veterinarian.

ASSISTANTS AND FOREMEN.

HENRY M. COTTRELL, M.S.,
Assistant Agriculturist.

WILLIAM SHELTON,
Foreman of Farm.

JAMES T. WILLARD, M.S.,
Assistant Chemist.

CHARLES L. MARLATT, M.S.,
Assistant Entomologist.

SILAS C. MASON,
Foreman of Gardens and Orchards.

WALTER T. SWINGLE,
Assistant Botanist.

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